

DEFENSE INDUSTRY BULLETIN

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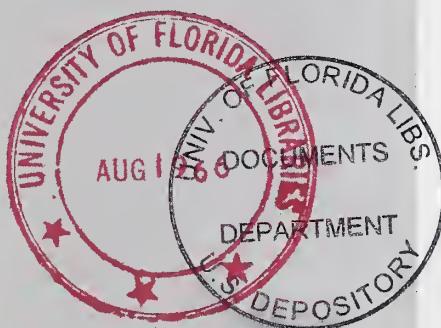
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DEPARTMENT OF DEFENSE



Publication of
**ASSISTANT SECRETARY OF
DEFENSE-PUBLIC AFFAIRS**

“The decisive factor for a powerful nation . . . is
the character of its relationship with the world . . .”



Hon. Robert S. McNamara

“First, we have to help protect those developing countries which genuinely need and request our help, and which—as an essential pre-condition—are willing and able to help themselves.

“Second, we have to encourage and achieve a more effective partnership with those nations who can and should share international peace-keeping responsibilities.

“Third, we must do all we realistically can to reduce the risk of conflict with those who might be tempted to take up arms against us.”

The foregoing is quoted from an address by the Secretary of Defense before the American Society of Newspaper Editors, May 18, 1966, in Montreal, Canada. The entire speech is reprinted in this issue of the *Defense Industry Bulletin* beginning on page 1.

Summer Job Program Announced by Sec. Def. McNamara

For the second consecutive year, Secretary of Defense Robert S. McNamara has ordered the establishment of additional summer jobs in the Defense Department for young men and women as part of the President's Youth Opportunity Campaign.

In a memorandum to all Military Departments and DOD agencies, Secretary McNamara directed that the new summer jobs, for young people between the ages of 16 and 21, be established at a ratio of at least one extra trainee for each 100 employees currently on the DOD payroll. The new jobs will be in addition to regular summer employment. Under this formula, approximately 10,000 new summer jobs would be created in DOD.

These new job opportunities for youth are to provide meaningful summer work and training opportunities. They may consist of any of the positions for which young men and women customarily are hired during the summer and such other work and training opportunities as can be made available.

Young people hired under the program will be paid \$1.25 an hour, except in those instances when they are employed in positions for which a higher wage is appropriate under regular classification processes.

In the 1965 summer program, more than 14,000 young men and women or 40 percent above the 1-100 ratio, were usefully employed by DOD. In his memorandum Secretary McNamara pointed out last summer's highly successful effort and added, "I expect all components of the Department of Defense to do at least as well this summer."

National Security Seminars Schedule Announced

The Industrial College of the Armed Forces (ICAF) has announced the dates and locations for National Security Seminars to be presented during the academic year 1966-67. These two-week sessions are open to reserve officers of all the Military Services and representatives of industry, labor, business, the professions, religion and education.

Each seminar is based on the 10-month resident course conducted by ICAF, and consists of a series of 34 illustrated presentations on topics and problems having a direct bearing on national security.

Senior officers from the faculty of ICAF, representing the Army, Navy, Air Force and Marine Corps, will conduct the seminars.

The schedule has been set as follows:

Sept. 26-Oct. 7, 1966	Baton Rouge, La.
Nov. 7-18, 1966	Quad-City Area (Moline, East Moline, Rock Island, Ill., and Davenport, Iowa.)
Jan. 16-27, 1967	Gainesville, Fla.
Feb. 13-24, 1967	Yakima, Wash.
March 6-17, 1967	Long Beach, Calif.
April 17-28, 1967	Wichita Falls, Tex.
May 15-26, 1967	Groton, Conn.

For information concerning registration and attendance, contact the Chamber of Commerce in any of the selected cities.



DEFENSE INDUSTRY BULLETIN

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The purpose of the *Bulletin* is to serve as a means of communication between the Department of Defense (DOD) and its authorized agencies and defense contractors and other business interests. It will serve as a guide to industry concerning official policies, programs and projects, and will seek to stimulate thought by members of the defense-industry team in solving the problems that may arise in fulfilling the requirements of the DOD.

Material in the *Bulletin* is selected to supply pertinent unclassified data of interest to the business community. Suggestions from industry representatives for topics to be covered in future issues should be forwarded to the Business & Labor Division.

The *Bulletin* is distributed without charge each month to representatives of industry and to agencies of the Department of Defense, Army, Navy and Air Force. Requests for copies should be addressed to the Business & Labor Division, OASD(PA), Room 2E813, The Pentagon, Washington, D.C. 20301, telephone, OXFORD 5-2709.

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Address by Secretary of Defense Robert S. McNamara Before American Society of Newspaper Editors Wednesday, May 18, 1966, Montreal, Canada

Any American would be fortunate to visit this lovely island city, in this hospitable land.

But there is a special satisfaction for a Secretary of Defense to cross the longest border in the world—and realize that it is also the least armed border in the world. It prompts one to reflect how negative and narrow a notion of defense still clouds our century.

There is still among us an almost eradicable tendency to think of our security problem as being exclusively a military problem—and to think of the military problem as being exclusively a weapon system or hardware problem.

The plain, blunt truth is that contemporary man still conceives of war and peace in much the same stereotyped terms that his ancestors did. The fact that these ancestors—both recent and remote—were conspicuously unsuccessful at avoiding war, and enlarging peace, doesn't seem to dampen our capacity for cliches.

We still tend to conceive of national security almost solely as a state of armed readiness; a vast, awesome arsenal of weaponry.

We still tend to assume that it is primarily this purely military ingredient that creates security.

We are still haunted by this concept of military hardware. But how limited a concept this actually is, becomes apparent when one ponders the kind of peace that exists between the United States and Canada.

It is a very cogent example. Here we are, two modern nations, highly developed technologically, each with immense territory, both enriched with great reserves of natural resources, each militarily sophisticated. Yet, we sit across from one another, divided by an unguarded frontier of thousands of miles, and there is not a remotest set of circumstances, in any imaginable time frame of the future, in which our two nations would wage war on one another.

It is so unthinkable an idea as to be totally absurd.

But why is that so?

Is it because we are both ready in an instant to hurl our military hardware at one another?

Is it because we are both zeroed in on one another's vital targets?

Is it because we are both armed to our technological teeth that we do not go to war?

The whole notion—as applied to our two countries—is ludicrous.

Canada and the United States are at peace for reasons that have nothing whatever to do with our mutual military readiness.

We are at peace—truly at peace—because of the vast fund of compatible beliefs, common principles and shared ideals.

We have our differences and our diversity—and let us hope for the sake of a mutually rewarding relationship we never become sterile carbon copies of one another.

But the whole point is that our basis of mutual peace has nothing whatever to do with our military hardware.

Now this is not to say, obviously enough, that the concept of military deterrence is no longer relevant in the contemporary world.

Unhappily, it still is critically relevant with respect to our potential adversaries.

But it has no relevance whatever between the United States and Canada.

We are not adversaries. We are not going to become adversaries. And it is not mutual military deterrence that keeps us from becoming adversaries. It is mutual respect for common principles.

Now I mention this—as obvious as it all is—simply as a kind of *reductio ad absurdum* of the concept that military hardware is the exclusive or even the primary ingredient of permanent peace in the mid-twentieth century.

In the United States over the past five years we have achieved a considerably improved balance in our total military posture. That was the mandate I received from Presidents Kennedy and Johnson; and with their support, and that of the Congress, we have been able to create a strengthened force structure of land, sea and air components—with a vast increase in mobility and materiel and with a massive superiority in nuclear retaliatory power over any combination of potential adversaries.

Our capabilities for nuclear, conventional and counter-subversive war have all been broadened and improved; and we have accomplished this through military budgets that were in fact lesser percentages of our gross national product than in the past.

From the point of view of combat readiness, the United States has never been militarily stronger.

We intend to maintain that readiness.

But if we think profoundly about the matter, it is clear that this purely military posture is not the central element in our security.

A nation can reach the point at which it does not buy more security for itself simply by buying more military hardware—we are at that point.

The decisive factor for a powerful nation—already adequately armed—is the character of its relationships with the world.

In this respect, there are three broad groups of nations: first, those that are struggling to develop; secondly, those free nations that have reached a level of strength and prosperity that enables them to contribute to the peace of the world; and, finally, those nations who might be tempted to make themselves our adversaries.

For each of these groups, the United States, to preserve its own intrinsic security, has to have distinctive sets of relationships.

First, we have to help protect those developing countries which genuinely need and request our help, and which—as an essential pre-condition—are willing and able to help themselves.

Second, we have to encourage and achieve a more effective partnership with those nations who can and should share international peace-keeping responsibilities.

Third, we must do all we realistically can to reduce the risk of conflict with those who might be tempted to take up arms against us.

Let us examine these three sets of relationships in detail.

First, the developing nations.

Roughly 100 countries today are caught up in the difficult transition from traditional to modern societies.

There is no uniform rate of progress among them, and they range from

primitive mosaic societies—fractured by tribalism and held feebly together by the slenderest of political sinews—to relatively sophisticated countries, well on the road to agricultural sufficiency and industrial competence.

This sweeping surge of development, particularly across the whole southern half of the globe, has no parallel in history.

It has turned traditionally listless areas of the world into seething cauldrons of change.

On the whole, it has not been a very peaceful process.

In the last eight years alone there have been no less than 164 internationally significant outbreaks of violence—each of them specifically designed as a serious challenge to the authority, or the very existence, of the government in question.

Eighty-two different governments have been directly involved.

What is striking is that only 15 of these 164 significant resorts to violence have been military conflicts between two states.

And not a single one of the 164 conflicts has been a formally declared war.

Indeed, there has not been a formal declaration of war—anywhere in the world—since World War II.

The planet is becoming a dangerous place to live on not merely because of a potential nuclear holocaust, but also because of the large number of *de facto* conflicts and because the trend of such conflicts is growing rather than diminishing.

At the beginning of 1958, there were 23 prolonged insurrections going on about the world. As of Feb. 1, 1966, there were 40.

Further, the total number of outbreaks of violence has increased each year: in 1958, there were 34; in 1965, there were 58.

But what is most significant of all is that there is a direct and constant relationship between the incidence of violence and the economic status of the countries afflicted.

The World Bank divides nations, on the basis of per capita income, into four categories: rich, middle-income, poor, and very poor.

The rich nations are those with a per capita income of \$750 per year or more. The current U.S. level is more than \$2,700. There are 27 of these rich nations. They possess 75 percent of the world's wealth, though roughly only 25 percent of the world's population.

Since 1958, only one of these 27 nations has suffered a major internal upheaval on its own territory.

But observe what happens at the other end of the economic scale.

Among the 38 very poor nations—those with a per capita income of under \$100 a year—no less than 32 have suffered significant conflicts. Indeed, they have suffered an average of two major outbreaks of violence per country in the eight-year period. That is a great deal of conflict.

What is worse, it has been, predominantly, conflict of a prolonged nature.

The trend holds predictably constant in the case of the two other categories: the poor, and the middle-income nations. Since 1958, 87 percent of the very poor nations, 69 percent of the poor nations, and 48 percent of the middle-income nations have suffered serious violence.

There can, then, be no question but that there is an **irrefutable relationship between violence and economic backwardness**. And the trend of such violence is up, not down.

Now, it would perhaps be somewhat reassuring if the gap between the rich nations and the poor nations were closing; and economic backwardness were significantly receding.

But it is not. The economic gap is widening.

By the year 1970, over one half of the world's total population will live in the independent nations sweeping across the southern half of the planet. But this hungering half of the human race will by then command only one-sixth of the world's total of goods and services.

By the year 1975, the dependent children of these nations alone—children under 15 years of age—will equal the total population of the developed nations to the north.

Even in our own abundant societies, we have reason enough to worry over the tensions that coil and tighten among underprivileged young people, and finally flail out in delinquency and crime. What are we to expect from a whole hemisphere of youth where mounting frustrations are likely to fester into eruptions of violence and extremism?

Annual per capita income in roughly half of the 80 underdeveloped nations that are members of the World Bank is rising by a paltry one percent a year or less. By the end of the century, these nations—at their present rates of growth—will reach a per capita income of barely \$170 a year. The United States, by the same criteria, will attain a per capita income of \$4,500.

The conclusion of all this is blunt and inescapable: given the certain connection between economic stagnation and the incidence of violence, the years that lie ahead for the nations in the southern half of the globe are pregnant with violence.

This would be true even if no threat of communist subversion existed—as it clearly does.

Both Moscow and Peking—however harsh their internal differences—regard the whole modernization process as an ideal environment for the growth of communism. Their experience with subversive internal war is extensive and they have developed a considerable array of both doctrine and practical measures in the art of political violence.

What is often misunderstood is that communists are capable of subverting, manipulating and, finally, directing for their own ends the wholly legitimate grievances of a developing society.

But it would be a gross oversimplification to regard communism as the central factor in every conflict throughout the underdeveloped world. Of the 149 serious internal insurrections in the past eight years, communists have been involved in only 58 of them—38 percent of the total—and this includes seven instances in which a communist regime itself was the target of the uprising.

Whether communists are involved or not, violence anywhere in a taut world transmits sharp signals through the complex ganglia of international relations; and the security of the United States is related to the security and stability of nations half a globe away.

But neither conscience nor sanity itself suggests that the United States is, should, or could be the Global Gendarme.

Quite the contrary, experience confirms what human nature suggests: that in most instances of internal violence the local people themselves are best able to deal directly with the situation within the framework of their own traditions.

The United States has no mandate from on high to police the world, and no inclination to do so. There have been classic cases in which our deliberate non-action was the wisest action of all.

Where our help is not sought, it is seldom prudent to volunteer.

Certainly we have no charter to rescue floundering regimes, who have brought violence on themselves by deliberately refusing to meet the legitimate expectations of their citizenry.

Further, throughout the next decade advancing technology will reduce the requirement for bases and staging rights at particular locations abroad, and the whole pattern of forward deployment will gradually change.

But—though all these caveats are clear enough—the irreducible fact re-

mains that our security is related directly to the security of the newly developing world.

And our role must be precisely this: to help provide security to those developing nations which genuinely need and request our help, and which demonstrably are willing and able to help themselves.

The rub comes in this: we do not always grasp the meaning of the word **security** in this context.

In a modernizing society **security means development**.

Security is not military hardware, though it may include it. Security is not military force, though it may involve it. Security is not traditional military activity, though it may encompass it.

Security is development.

Without development, there can be no security.

A developing nation that does not in fact develop simply cannot remain "secure."

It cannot remain secure for the intractable reason that its own citizenry cannot shed its human nature.

If security implies anything, it implies a minimal measure of order and stability.

Without internal development of at least a minimal degree, order and stability are simply not possible. They are not possible because human nature cannot be frustrated beyond intrinsic limits. It reacts because it must.

Now, that is what we do not always understand; and that is also what governments of modernizing nations do not always understand.

But by emphasizing that security arises from development, I do not say that an underdeveloped nation cannot be subverted from within, or be aggressed upon from without, or be the victim of a combination of the two.

It can. And to prevent any or all of these conditions, a nation does require appropriate military capabilities to deal with the specific problem. But the specific military problem is only a narrow facet of the broader security problem.

Military force can help provide law and order, but only to the degree that a basis for law and order already exists in the developing society—a basic willingness on the part of the people to cooperate.

The law and order is a shield, behind which the central fact of security—development—can be achieved.

Now we are not playing a semantic game with these words.

The trouble is that we have been lost in a semantic jungle for too long. We have come to identify "security" with exclusively military phenomena,

and most particularly with military hardware.

But it just isn't so. And we need to accommodate to the facts of the matter if we want to see security survive and grow in the southern half of the globe.

Development means economic, social and political progress. It means a reasonable standard of living—and the word "reasonable" in this context requires continual redefinition. What is reasonable in an earlier stage of development will become unreasonable in a later stage.

As development progresses, security progresses; and when the people of a nation have organized their own human and natural resources to provide themselves with what they need and expect out of life, and have learned to compromise peacefully among competing demands in the larger national interest, then their resistance to disorder and violence will be enormously increased.

Conversely, the tragic need of desperate men to resort to force to achieve the inner imperatives of human decency will diminish.

Now, I have said that the role of the United States is to help provide security to those modernizing nations, providing they need and request our help and are clearly willing and able to help themselves.

But what should our help be?

Clearly, it should be help towards development. In the military sphere, that involves two broad categories of assistance.

We should help the developing nation with such training and equipment as is necessary to maintain the protective shield behind which development can go forward.

The dimensions of that shield vary from country to country; but what is essential is that it should be a shield and not a capacity for external aggression.

The second—and perhaps less understood category of military assistance in a modernizing nation—is training in civic action.

Civic action is another one of those semantic puzzles. Too few Americans—and too few officials in developing nations—really comprehend what military civic action means.

Essentially, it means using indigenous military forces for non-traditional military projects—projects that are useful to the local population in fields such as education, public works, health, sanitation, agriculture—independent, anything connected with economic or social progress.

It has had some impressive results. In the past four years, the U.S.-assisted civic action program, worldwide, has constructed or repaired

more than 10,000 miles of roads; built over 1,000 schools, hundreds of hospitals and clinics; and has provided medical and dental care to approximately four million people.

What is important is that all this was done by indigenous men in uniform. Quite apart from the developmental projects themselves, the program powerfully alters the negative image of the military man as the oppressive preserver of the stagnant *status quo*.

But assistance in the purely military sphere is not enough. Economic assistance is also essential. The President is determined that our aid should be hard headed and rigorously realistic: that it should deal directly with the roots of under-development, and not merely attempt to alleviate the symptoms. His bedrock principle is that U.S. economic aid—no matter what its magnitude—is futile unless the country in question is resolute in making the primary effort itself. That will be the criterion, and that will be the crucial condition for all our future assistance.

Only the developing nations themselves can take the fundamental measures that make outside assistance meaningful. These measures are often unpalatable and frequently call for political courage and decisiveness. But to fail to undertake painful, but essential reform inevitably leads to far more painful revolutionary violence. Our economic assistance is designed to offer a reasonable alternative to that violence. It is designed to help substitute peaceful progress for tragic internal conflict.

The United States intends to be compassionate and generous in this effort, but it is not an effort it can carry exclusively by itself. And, thus, it looks to those nations who have reached the point of self-sustaining prosperity to increase their contribution to the development—and, thus, to the security—of the modernizing world.

And that brings me to the second set of relationships that I underscored at the outset: it is the policy of the United States to encourage and achieve a more effective partnership with those nations who can, and should, share international peace-keeping responsibilities.

America has devoted a higher proportion of its gross national product to its military establishment than any other major free world nation. This was even true before our increased expenditures in Southeast Asia.

We have had, over the last few years, as many men in uniform as all the nations of Western Europe combined, even though they have a pop-

ulation half again greater than our own.

Now, the American people are not going to shirk their obligations in any part of the world, but they clearly cannot be expected to bear a disproportionate share of the common burden indefinitely.

If, for example, other nations genuinely believe—as they say they do—that it is in the common interest to deter the expansion of Red China's economic and political control beyond its natural boundaries, then they must take a more active role in guarding the defense perimeter.

Let me be perfectly clear: this is not to question the policy of neutralism or non-alignment of any particular nation. But it is to emphasize that the independence of such nations can—in the end—be fully safeguarded only by collective agreements among themselves and their neighbors.

The plain truth is the day is coming when no single nation, however powerful, can undertake by itself to keep the peace outside its own borders. Regional and international organizations for peace-keeping purposes are as yet rudimentary; but they must grow in experience and be strengthened by deliberate and practical cooperative action.

In this matter, the example of Canada is a model for nations everywhere. As Prime Minister Pearson pointed out eloquently in New York just last week: Canada "is as deeply involved in the world's affairs as any country of its size. We accept this because we have learned over 50 years that isolation from the policies that determine war does not give us immunity from the bloody, sacrificial consequences of their failure. We learned that in 1914 and again in 1939. That is why we have been proud to send our men to take part in every peace-keeping operation of the United Nations—in Korea, and Kashmir, and the Suez, and the Congo, and Cyprus."

The Organization of the American States in the Dominican Republic, the more than 30 nations contributing troops or supplies to assist the government of South Vietnam, indeed even the parallel efforts of the United States and the Soviet Union in the Pakistan-India conflict—these efforts, together with those of the United Nations, are the first attempts to substitute multinational for unilateral policing of violence. They point to the peace-keeping patterns of the future.

We must not merely applaud the idea. We must dedicate talent, resources and hard practical thinking to its implementation.

In Western Europe—an area whose burgeoning economic vitality stands as a monument to the wisdom of the

Marshall Plan—the problems of security are neither static nor wholly new. Fundamental changes are under way, though certain inescapable realities remain.

The conventional forces of NATO, for example, still require a nuclear backdrop beyond the capability of any Western European nation to supply, and the United States is fully committed to provide that major nuclear deterrent.

However, the European members of the alliance have a natural desire to participate more actively in nuclear planning. A central task of the alliance today is, therefore, to work out the relationships and institutions through which shared nuclear planning can be effective. We have made a practical and promising start in the Special Committee of NATO Defense Ministers.

Common planning and consultation are essential aspects of any sensible substitute to the unworkable and dangerous alternative of independent national nuclear forces within the alliance.

And even beyond the alliance, we must find the means to prevent the proliferation of nuclear weapons. That is a clear imperative.

There are, of course, risks in non-proliferation arrangements, but they cannot be compared with the infinitely greater risks that would arise out of the increase in national nuclear stockpiles.

In the calculus of risk, to proliferate independent national nuclear forces is not a mere arithmetical addition of danger. We would not be merely adding up risks. We would be insanely multiplying them.

If we seriously intend to pass on a world to our children that is not threatened by nuclear holocaust, we must come to grips with the problem of proliferation.

A reasonable nonproliferation agreement is feasible. For there is no adversary with whom we do not share a common interest in avoiding mutual destruction triggered by an irresponsible nth power.

That brings me to the third and last set of relationships the United States must deal with: those with nations who might be tempted to take up arms against us.

These relationships call for realism. But realism is not a hardened, inflexible, unimaginative attitude. The realistic mind is a restlessly creative mind free of naive delusions, but full of practical alternatives.

There are practical alternatives to our current relationships with both the Soviet Union and Communist China.

A vast ideological chasm separates

us from them—and to a degree, separates them from one another.

There is nothing to be gained from our seeking an ideological rapprochement; but breaching the isolation of great nations like Red China, even when that isolation is largely of its own making, reduces the danger of potential catastrophic misunderstandings, and increases the incentive on both sides to resolve disputes by reason other than force.

There are many ways in which we can build bridges toward nations who would cut themselves off from the meaningful contact with us. We can do so with properly balanced trade relations, diplomatic contacts and, in some cases, even by exchanges of military observers.

We have to know where it is we want to place this bridge, what sort of traffic we want to travel over it, and on what mutual foundations the whole structure can be designed.

There are no one-cliff bridges. If you are going to span a chasm, you have to rest the structure on both cliffs.

Now cliffs, generally speaking, are rather hazardous places. Some people are afraid even to look over the edge. But in a thermonuclear world, we cannot afford any political acrophobia.

President Johnson has put the matter squarely. By building bridges to those who make themselves our adversaries "we can help gradually to create a community of interest, a community of effort."

With respect to a "community of effort," let me suggest a concrete proposal for our own present young generation in the United States.

It is a committed and dedicated generation. It has proven that in its enormously impressive performance in the Peace Corps overseas; and in its willingness to volunteer for a final assault on such poverty and lack of opportunity that still remain in our own country.

As matters stand, our present Selective Service System draws on only a minority of eligible young men.

That is an inequity.

It seems to me that we could move toward remedying that inequity by asking every young person in the United States to give two years of service to his country—whether in one of the Military Services, in the Peace Corps, or in some other volunteer developmental work at home or abroad.

We could encourage other countries to do the same; and we could work out exchange programs much as the Peace Corps is already planning to do.

While this is not an altogether new suggestion, it has been criticized as

(Continued on Page 12)

Ideas and Know-How Key to Small Business Success

A familiar cliche that has been kicking around the business world for too many years holds that only large companies are capable of competing successfully for Department of Defense contracts. Until recently, the feeling was that only a huge concern with a lot of sophisticated equipment backed up by years of experience could satisfy the needs of the military, particularly in the area of new systems and weapons.

However, the idea that small companies don't stand a chance against larger corporations is becoming more obsolete every year. Some of the largest DOD contractors today began not long ago as small business suppliers. Such well known corporations as Litton Industries, Sanders Associates and Teledyne all started as small concerns and expanded because of their competent work on DOD projects.

A small company with a good idea and a lot of technical knowledge always has a good chance of competing in the same league as the "big boys." This is possible because DOD recognizes that creative thinking based on sound technical background is valuable whether it originates in large or small organizations.

An example of a small company success is the case history of the Stencel Aero Engineering Corp. of Asheville, N.C.

The ability of this company's managers to understand and provide hardware solutions for specific military problems has been the driving force responsible for the organization's growth from a three-man operation in 1958 into a corporation that grossed nearly a million dollars last year.

The founder of this remarkable company is Fred B. Stencel, a native of Yugoslavia born in 1909. After acquiring an impressive technical background abroad, including post-graduate work in aero-elasticity, aerodynamics and hydrodynamics, Stencel came to the United States in 1916 and went to work for the U.S. Army.

A few years later, after serving for a short time with a private arms

industry, Stencel decided to branch out on his own and develop an idea which had come to him during his experience in working with parachute development for the Army.

One of his accomplishments while working with the Oerlikon Tool and Arms Corp. was the invention of the first practicable and repeatable parachute capable of functioning in a wide range of aerodynamic conditions. This concept became the cornerstone of what was later to be his own company.

Setting up shop in an abandoned barn near Asheville, N.C., Stencel and two comrades began to develop the idea. The trio's first success came when the Air Force awarded them a contract for further development of ballistically deployed and ballistically spread parachutes to provide escape from slow-moving planes operating at low altitudes.

After successfully completing this assignment, the company was picked to develop a 100-foot diameter parachute which would provide a safety system for high-altitude manned balloons. Stencel's growing company was contracted to design and deliver a recovery system for the U.S. Navy's Strato-Lab Project in eight weeks. Stencel and his assistants met the deadline and produced a parachute system which would achieve full recovery within a drop distance of 100 feet compared to 1,000 to 1,500 feet which was the limit of conventional parachutes at that time.

Much of the work done on the Navy project, including construction of two 100-foot testing towers, was done under extremely adverse conditions resulting from the aftermath of a disastrous hurricane that had lashed Asheville a few days earlier.

This tenacity to succeed in assignments was recognized and led to other small Government prime and sub-contracts which aided in the growth of the young company.

In 1960, the Navy's Bureau of Weapons awarded Stencel Aero Engineering Corp. a contract to develop a ballistic parachute system for use with ejection seats and, in 1961, after heavy competition, the company was

chosen to develop a new concept for emergency escape and survival from aircraft.

The result of all this labor was the MODULAR system (Modular Restraint, Recovery and Survival System) which combined the various separate escape system components already developed thus increasing overall escape and survival capabilities.

This work led to Stencel's interest in other escape system problems. One question which had been bothering aircraft engineers was how to deal with the angular momentum of the man-seat combination of the ejection escape system which occurred because the center of gravity varies from man to man.

Working on this problem on his own time and using his own funds, Stencel came up with the answer. The result was the DART system, a major contribution in aerospace engineering now universally recognized as a requirement for rocket escape systems.

The company is now busy on an escape system called MODPAC. This system will combine the development work done on the ballistic parachute, the MODULAR system and the DART system. Stencel expects that the system will be ready for production and installation into military aircraft by June this year.

A gauge of the company's phenomenal growth, which has been based completely on DOD prime and sub-contracts, can be seen in a comparison of the net sales which, in 1959, totaled \$79,657 and in 1965 were just short of a million dollars.

One of the main reasons for the success of the Stencel Aero Engineering Corp. is the company's ability to devise simple and practical hardware solutions to complex problems and the ability to bring together in one organization creative people with diverse technical backgrounds and form these people into an efficient team which has maintained a continued high standard of performance.

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Military Exports and World Affairs

by

Henry J. Kuss, Jr.

Dep. Asst. Secretary of Defense

(International Logistics Negotiations)

Many in the industrial community must already be aware of the linkage between military exports and world affairs. In this article I would like to cover this relationship in three ways:

- To identify this linkage in quantitative or proportional terms.

- To describe the military-political-economic linkage to these exports in some of the significant negotiations of the recent past.

- Finally in greater detail, to examine some of the world forces that are set in movement by this export program as they apply specifically to Europe and as they are manifested in the United Kingdom's consideration of its own industry.

First, let us take a brief look at the scope of military exports in recent years and the potential for the next few years. In FY 1965 military export orders rose to \$1.82 billion for the highest amount since the beginning of the program in the 1961-1962 period. This represented a 600 percent increase over the annual experience most representative of the 1950's.

Over \$7 billion in potential has been identified for the period 1966-1968 or an average of almost \$2.5 billion per year.

We expect military export orders to continue at a minimum of \$1 to \$1.5 billion a year as long as it is necessary for the free world to maintain adequate defense.

The annual average of military export sales in the last four years is over four times as large as the average over the 10 prior years.

Military export sales and orders more than doubled Military Assistance grant aid obligations for weapons and equipment during FY 1965.

Since the end of FY 1961, the United States has received orders, commitments and options for over \$9 billion of military equipment.

About 1.2 million man years of em-

ployment, spread through all 50 states and the District of Columbia, will result from this effort.

Almost \$1 billion in additional profits will accrue to U. S. industry.

Case receipts amounted to almost \$5 billion for the last five years.

Linkage in Quantitative or Proportional Terms.

Turning now to the relationship of military exports and world affairs in quantitative or proportional terms, let me ask you to ponder the anomalies inherent in these questions:

- Are you aware that while military exports constitute less than five percent of the total defense business in the United States, they constitute a much more significant proportion of the balance of the free world's defense business, running 15 to 25 percent average and sometimes 50 to 75 percent of individual area or country defense expenditures?

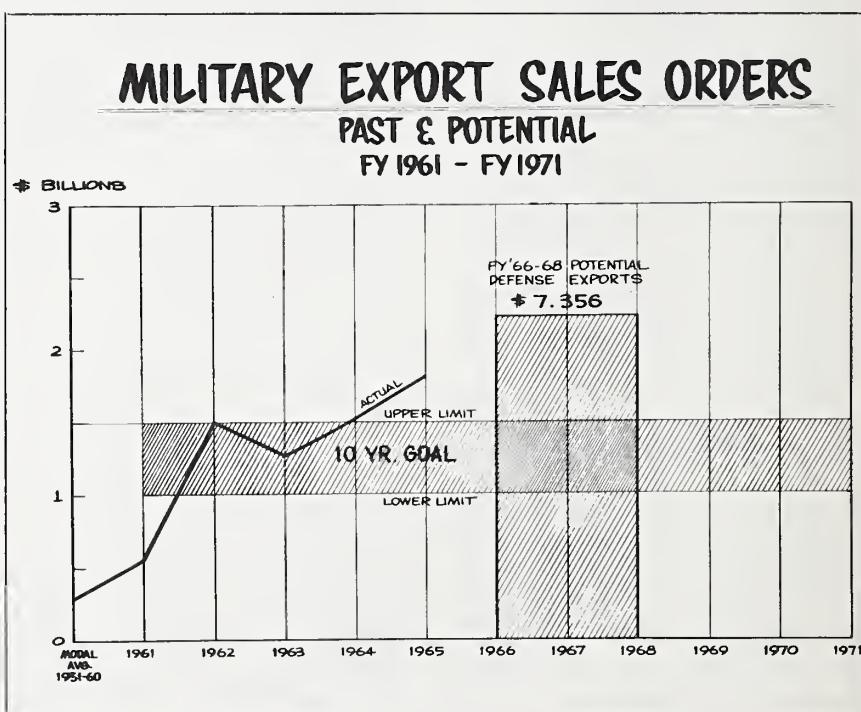
- Are you aware that, while military exports constitute less than four percent of our annual expenditures to develop U. S. forces, they account for almost half of the deployment costs of those forces as measured against our balance of payments?

- Are you aware that, while we have sold to about 60 nations in the recent past, less than 10 of these nations account for almost 90 percent of the sales?

Let's take a look at these three quantitative expressions and see how they affect world affairs. Starting with the last one—10 of the nations account for 90 percent of the sales—what this really means is that our major sales are to those countries who have the largest and most ready forces who make up the bulk of allied military readiness. In order of their significance in the sales program, they are:

- German forces, who have bought over \$3 billion from us in the last four years and who will in time of war actually make up, together with our five divisions in Europe, one of the major field armies defending NATO.

- The United Kingdom which, with the signing of the F-111 program, is expected to spend over \$2 billion in the United States for military arms in future years and which constitutes the principal European



nation maintaining, with the United States, world-wide responsibility for the maintenance of peace—from Germany to the Atlantic Ocean to Libya to the Indian Ocean to Malaysia.

- Australia, a nation coming alive to the problem of preparedness in Southeast Asia and the need to provide for its defense, a nation which has or will purchase \$.53 billion of military products from the United States.

- Italy, Canada, Belgium and other NATO nations which constitute a major link in our world-wide forward strategy, buying almost another billion dollars of products to strengthen their defenses.

- Japan, awakening to its self-defense responsibilities, in the context of a growing national product, is closely aligned with the free world.

Let's look at the facts brought out by the second question: while military exports are four percent of our total annual defense budget, they account for more than half of the deployment costs of our forces, measured in balance of payments terms. Here we are not talking about allied strength, but are talking about our ability to project our strength around the world. The ability of this country to follow a forward strategy is heavily influenced by the balance of payments costs attributable to such a strategy. If we were unable to maintain adequate military deployment, we might be unable to seize political opportunities, or we might not be able to follow a strategy of defending the United States at the frontiers of the non-communist world, or we might have to seek these objectives with higher risks. The receipts from military exports are of interest to the nation because of their major contribution to offsetting the foreign exchange deployment costs of our strategy.

Turning to the first point—while military exports constitute less than five percent of the total funds spent for the acquisition and development of military production in the United States, they constitute 15 to 25 percent average and sometimes 50 to 75 percent of individual country defense expenditures. No other figure magnifies the relationship of military exports to world affairs as compared with domestic affairs. While a sale may constitute three percent or less of our total or an individual com-

pany's business, it is almost always 25 percent or more of the foreign country's defense program. This means that, while the military export transaction may be very peripheral to a company's business life, it is decidedly anything but peripheral at the other end of the pipeline. Sometimes this difference in perspective between the supplier and the customer leads to complications contrary to our national interests.

Thus, you can see that the impact of our military exports, although large in itself for domestic consideration, is multiplied manyfold when viewed from a world affairs point of view:

- From considerations of military strength of countries allied to us.

- From the point of view of our own economic health in the world and ability to deploy for a forward strategy.

- From the point of view of the impact on the customer country's political and economic environments.

Military-Political-Economic Linkage

I should like to turn now to a non-quantitative look at some of our principal military export areas of effort and see how these relate to world affairs.

First, as I have already mentioned with respect to Germany, our program is part of a very carefully worked out set of international activities between the German Armed Forces and the American Armed Forces. These activities are of benefit to the equipment, logistics and training readiness of the German Armed Forces, as well as being of benefit to both nations in making it economically feasible for the United States to deploy a large force in the forward area. It is a program that manifests itself in carefully planned meetings of military and civilian staffs at all levels of government—integrated lines of logistics communication—integrated lines of voice and digital communications throughout our entire depot supply system—co-operation in research and development—joint use of training facilities and depots wherever possible—joint development of weapons like the Main Battle Tank of 1970—and even the gripping problems like metric versus inch system.

In the United Kingdom, contrary to popular belief, the military export

program never was a sales program. It was a program worked out in direct response to the United Kingdom's needs to put forth a defense establishment within an economic belt tightening program. The three recent aircraft programs were part of an action to save well over \$1 billion in the British defense budget. Without this action the British Armed Forces would have been considerably more restricted in manifesting a British defense responsibility throughout the world. This was a program that represented our national interest in world affairs as well. Its solution in the context of international politics required the closest association between government and industry action. The action of McDonnell, General Dynamics and Lockheed working with the U. S. Government on this program of international cooperation has been excellent.

In Australia our military export program was first a manifestation of close U. S.-Australian military-to-military interests. Secondly, it was a result of the growing Australian recognition of the severity of the Southeast Asian problem and, thirdly, a cooperation in the broadest field of international finance—before it ever became a sales program.

Our program in Canada was and is a demonstration of the reciprocity required between two nations whose economies are so closely linked. Without such recognition the Canadian Armed Forces could not gain the benefits of the Canadian-American defense common market.

Our programs in India and Iran were negotiated in such a way that they were as much a recognition of the need for military strength against the communist bloc as they were a recognition of the need to maintain the expenditure of resources on military activity within certain reasonable financial levels—levels that did not interfere with the economic and social progress of each country's program.

Similarly, our examination of the future aviation products in Latin America involves as much a question of the relationship to the entire success of the Alliance for Progress as it does individual military sales.

In the Middle East our actions are as much a part of attempting to

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Navy Authorized Data List-- A Management Technique

by
A. N. Bayer

Added to a progressive series of Navy planned actions in the area of improved management of technical logistics data and information is the promulgation of the "Navy Authorized Data List (NADL)." The NADL—a management technique—is designed to identify, record and control every significant technical data requirement for which there exists a legitimate need in the Navy.

The issuance of the Authorized Data List as a limited coordination Military Handbook, MIL-HDBK-222 (Navy), provides a "master" reference list from which Navy procuring activities are able to select and specify data requirements for bids and proposals. Approved data items are included in DD Form 1423, "Contractor Data Requirement List." Such specificity provides a basis for a full, clear and firm understanding between the Navy and its contractors with respect to the total data requirements at the time the contract is placed.

What types and kinds of data are referenced in the NADL? It includes specifications, standards, engineering drawings, associated lists, data lists, bills of material, parts lists, technical manuals, handbooks and orders, engineering changes and control documents, design data, provisioning parts lists and related initial support data, reliability, maintainability and other systems effectiveness documents, acceptance test procedures, PERT time, cost and management information, personnel and human factors data, and reports (including scientific and technical reports). It includes without limitation those varieties of technical data (whether applicable to research, engineering, logistics, or other functions) derived at any phase of development (conceptual, definition, acquisition, or operational support phase) or a complete weapon system, equipment, or item.

Control over the generation of data requirements in "parent documents" must be maintained in order to ensure a truly useful authorized data list. The Navy did not choose to stop the development of data requirements in

parent documents, particularly specifications.

In compliance with the objectives of the DOD Standardization Program and the Armed Services Procurement Regulation (ASPR), Section 1, Part 12, "Specifications, Plans and Drawings," the Navy has prepared many specifications for use in design and procurement of systems, end items, primary equipment, items, materials and services. In many instances, specifications (as accurate and complete descriptions of the technical requirements) include specific data requirements in order that both the contractor and the Government may readily determine that the total requirements have been met. The specification represents an established system featuring a common language which permits, encourages and facilitates communication between the Military Services and industry. Established and well documented procedures exist for the coordination of specifications, and all data requirements in coordinated specifications represent joint Service agreements with generous in-

dustry input. Deviations to specifications are subjected to a degree of control which may not be available in the case of unilateral decisions on deviations to separate data item sheets or forms.

Further, specifications are widely recognized and used throughout industry. They are recorded in the DOD Index of Specifications and Standards (DODISS) and are readily available from the DOD Single Stock Point. Accordingly, the concept and content of the NADL requires that a positive relationship be established to "data call-outs in specifications" (wherein the data requirements are related to the hardware procurement or the task to be performed). The Navy intends to develop a fully prepared Form DD 1423 for most of its primary equipment or end item specifications.

How can control be maintained over the generation of data requirements in parent documents? The Navy's approach was elementary in regard to the tedious manual methods employed during the review of source documents. Yet, the approach was unique in that decisions over approved data items and the document sources of such items were recorded and programmed for publication purposes by the use of automatic data processing methods. Some 40,000 documents (including all Navy and other DOD coordinated specifications in the DOD Index of Specifications and Standards) were manually reviewed, page by page, paragraph by paragraph, in screening for data items. These 40,000 documents, if stacked vertically, would be some 35 feet in height. Every data item referenced in a document was identified and then catalogued by means of electric accounting punched card methods.

Non-approved data items were "scrubbed down and out." Approved data items were recorded as to the recognized identification number of the basic source document and to its applicable location (paragraph number) in the document. Further identification was made to the cognizant Navy material bureau technical code having primary responsibility over the data item. By this latter identification, continued engineering support is ensured by the "hardware" or "product" engineers who are called upon to determine applicable data items in fulfilling the DD 1423 requirements. As Navy source docu-



Albert N. Bayer of the Logistic Support Div., Engineering Branch, Office of Naval Materiel, has more than 25 years experience working with the U.S. Navy. He began his service in 1942 with a ten-year tour at the Pearl Harbor Naval Shipyard. He has also worked with the Submarine Supply Office and the Bureau of Ships. He began his present assignment in 1957.

ments are initiated or revised in the future, intra-departmental procedures have been established to maintain mechanized control over the data items.

For complete flexibility and optimum usage, the NADL is prepared by automatic data processing methods and is arranged in four parts to permit entry and data selection on the basis of:

- An "Alphabetical" Listing of Primary (Hardware or Work Tasks) Documents arranged by the actual title (name) of the hardware or work task.

- A "Numerical" Listing of Primary (Hardware or Work Tasks) Documents arranged by the number of the applicable source material.

- A "Functional Category" Listing of all data items grouped to serve a specific function (e.g., design data, configuration control, reliability, logistics).

- An "Alphabetical" Listing of all data items which are included in basic source documents.

The NADL contains some 1,800 different data items. A specific data item, however, may have multi-application and use with several different types of hardware specifications. As a result, some 7,000 gross data item references have been recorded together with their referenced application to some 2,600 source documents (e.g., specifications, contract requirements bulletins). The NADL approaches a true minimum-maximum data list far broader in scope and coverage than that of 400-500 generalized data forms which the Navy originally intended to adopt. An old adage is "the proof of the pudding lies in the eating." Extensive review of completed, contractually agreed upon DD 1423's reveals that over 86 percent of the specified data items are "approved" data items which are included in the NADL. Such a high percentage of approved data items would not have been achieved if generalized data forms had been adopted with no correlation to the basic source documents which require the data.

Compilation of the NADL basically involves the consolidation (and reduction) of many existing definitized data requirements. These data requirements in many instances are already tailored to specific naval warfare systems, subsystems, end items, equipment, or work tasks. Determina-

tions of data items from the NADL are made by:

- Utilizing a data Provisioning Check List Concept.

- Giving careful consideration to the immediately planned and probable use of the actual weapon system, item, or service to which the data relates.

- Selecting data items on the basis of the intended use(s) of the data.

- Selecting data items only after analysis of the various types of data contained in the data packages which are related to the acquisition phases in which they are required.

In what single document do Navy personnel obtain the necessary criteria and guidance to make the above data determinations? NAVMATINST 4000.15, Nov. 20, 1964, titled "Management of Technical Data and Information—A Policy Manual," incorporates into a single publication comprehensive statements of policy and procedures to govern the management of technical logistics data and information within the Department of the Navy. The instruction applies to the acquisition of technical data, whether procured from contractors or prepared within the Navy, and its management in research, engineering, technical requirements, maintenance, quality assurance (including inspection), procurement and all other functions of the Navy, directly or indirectly concerned with such data.

Does the Navy support the increased emphasis being placed upon technical data management by DOD? Indeed so. In fact, in 1960 the Navy conducted a departmental-wide review of the policies and procedures of the bureaus and field activities regarding the acquisition, control and use of Navy-procured drawings and technical data. Principal objectives of the review were (1) to determine the strengths, weaknesses and controversial areas concerning the administrative, legal, contractual, technical and operational aspects of technical data management and (2) to recommend specific corrective actions to eliminate discrepancies, reduce data procurement costs, insure optimum use of acquired technical data and increase competitive procurement through improved use of technical data packages.

As a direct result of the Navy review, SECNAV Instruction 4120.12, "Establishment of Requirements for

Engineering Drawings, Associated Lists and Additional," was issued in December 1960. This instruction was not only comprehensive but it was also unique in that it was:

- First to establish department-wide uniform procedures for limiting data requirements to those necessary to satisfy the Navy's intended uses, and to describe specific data generally needed for competitive procurement as well as for eight other principal intended uses of data (e.g., design approval and evaluation, provisioning, maintenance).

- First to prescribe negotiating techniques and guides related to pricing of data.

- First to prescribe means of satisfying data needs by less costly methods of preparation by using industry drafting standards.

- First to prescribe procedures to assure maintenance of data on items subject to continued Navy use and supply support to depict accurately changes or revisions in the items to which the data relates.

- First to provide for the organization and functions of Data Review Boards which review the establishment of data requirements and the acquisition of data.

All of the above innovations, together with additional DOD and Navy cost effectiveness implementing principles in the area of technical data management, are carried over in NAVMATINST 4000.15.

Navy planning for the future provides for the support of optimum uniformity and standardization of technical data management techniques throughout DOD as proposed by the Office of Technical Data and Standardization Policy in the Office of the Assistant Secretary of Defense (Installations and Logistics). A joint task, under the chairmanship of that office, is the consideration of a DOD Authorized Data List (DADL). This task, incidentally, was proposed by the Navy. The concept of developing a DADL is based on the principle that there is considerable commonality of data items both intra and interdepartmental-wise. It should also be recognized, however, that a substantial number of uncommon data requirements exist both intra and interdepartmental-wise. The Navy, although recognizing the concept of standard generalized data

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U.S. Government-Newport News Shipbuilding Firm Sign Equal Employment Opportunity Agreement

by

Allan Reeves

Office of Civil Rights & Industrial Relations
Office of Asst. Secretary of Defense (Manpower)

As a result of concerted effort by several Federal Government agencies, a historic first was achieved in the agreement signed in April between the nation's largest shipbuilder and the Equal Employment Opportunity Commission.

The Newport News, Virginia, Shipbuilding & Drydock Co., became the first major company to sign a comprehensive agreement covering its responsibilities and obligations in the area of equal employment opportunity. The pattern, established during the six days of intensive negotiation in Washington, D.C., may well have a far-reaching effect, for the correction of discrimination, on other industries.

Secretary of Labor W. Willard Wirtz, whose Office of Federal Contract Compliance directs Government agency contracting officers in their equal employment opportunity programs, said, "The successful completion of these negotiations resulted from a concerted Government effort to make Equal Employment Opportunity a fact at this major shipbuilding firm."

The Newport News Shipbuilding and Drydock Co. builds nuclear submarines, aircraft carriers and other ships for the U. S. Government. Its contracts run into billions of dollars. The company presently employs about 20,000 persons, of whom about 5,000 are Negroes. Its last report to the Government showed that only 32 out of 1,997 persons employed in supervisory positions were Negroes. In addition, the report indicated that only six out of 506 apprentices enrolled were Negroes.

Based on this report, a determination was made by the Departments of Defense and Labor that Newport News was in noncompliance with the rules and regulations carrying out the provisions of Executive Order 11246 dealing with Federal contracts.

Concurrently, 41 Negro employees filed employment discrimination charges under Title VII of the Civil

Rights Act of 1964. The Civil Rights Act of 1964, under Title VII, provides that relief from employment discrimination may be sought by injured parties.

As a result of these actions, Newport News began conciliation sessions in an attempt to work out an agreement that would prove acceptable to all parties concerned.

During the course of the meetings between the Government and Newport News, an order was issued by the Secretary of Labor directing all Federal agencies not to award contracts to Newport News until the agencies and the Department of Labor were satisfied that the company was in compliance with the Executive Order requiring equal employment opportunity. Upon completion of the agreement, the Labor Department's order was rescinded.

The remedial program, which the Government and the company developed, reflects a program of full scale dynamic affirmative action designed to counteract effects of prior discrimination.

Under the terms of the agreement, an outside expert, approved by the company and the Government, will evaluate jobs and pay rates in the Newport News plant to determine whether Negroes are being paid the same rates as whites doing substantially equivalent work. Where it is determined that Negroes are being paid discriminatory rates, they will be immediately raised to equivalent levels with white employees.

A team of DOD equal employment opportunity specialists will conduct a survey of key departments of the company to determine the promotion pattern of white employees over past years. The history of Negro promotions will be compared to the white promotion profile and, where Negroes have not progressed accordingly, they will be promoted immediately.

Provisions of the agreement provide for the immediate promotion of

three Negroes, who had filed charges, to supervisory positions and rapid conciliation of the complaints of the other 38 charging parties. The agreement further provides for:

- Opening of all job classifications to all employees without discrimination.
- Complete elimination of segregated facilities.
- Revision of promotion policies and practices to improve opportunities for qualified Negroes to and within supervisory levels.
- Improvements of transfer procedure to other departments for Negroes.
- Re-evaluation of Negro employee skills.
- Institution of training programs to develop and improve Negro skills.
- Promotion and pay adjustment on the basis of such evaluation and/or training.
- Permitting qualified Negroes equal opportunity to apprenticeship programs and actively recruiting for such programs in Negro schools.

Other major areas of agreement include the posting and issuance of a new nondiscrimination policy statement, signed by the president of the company. This statement, which is to be attached to the paycheck of each full-time employee within 30 days from the date of the signing of the agreement, emphasizes the company's fundamental policy of providing equal opportunity in all areas of employment practice and assuring that there shall be no discrimination against any person on grounds of race, color, religion, or national origin.

The company plans to assemble all supervisory employees to read the policy statement to them, and advise them of the terms of the agreement. They will be informed that the importance of fulfilling company policy cannot be over-emphasized. They will be told that any violation of the let-

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DEPARTMENT OF DEFENSE

President Johnson has nominated General Earle G. Wheeler, USA, for his second two-year term as Chairman of the Joint Chiefs of Staff. General Wheeler succeeded General Maxwell D. Taylor as Chairman of the Joint Chiefs in 1964.

Maj. Gen. Earl C. Hedlund, USAF, has been named to succeed **Maj. Gen. Francis C. Gideon, USAF**, as Dep. Dir., Defense Supply Agency, effective in July.

Brig. Gen. William T. Smith, USAF, has been reassigned to duty as Chief of Staff, Defense Communications Agency.

E. Grogan Shelor, Jr., has joined the Department of Defense as Asst. Dir. of Defense Research and Engineering (Communications & Electronics). He succeeds **Thomas F. Rogers**, who has become Dep. Dir. of Defense Research and Engineering (Electronics and Information Systems).

Brig. Gen. Glen J. McClernon, USAF, will take command of the Defense Electronics Supply Center, Dayton, Ohio, in July.

Col. Robert E. Lee, USAF, has been designated Executive Dir. (Procurement and Production), Defense Supply Agency. His nomination for the rank of brigadier general has also been approved.

Col. William H. Herndon, USA, has been named to succeed **Capt. Andrew M. McCrone, SC, USN**, as Commander, Defense Depot, DSA Mechanicsburg, Pa. Capt. McCrone has been reassigned to the Navy Weapons Supply Activity, Washington, D.C.



ABOUT PEOPLE

Brig. Gen. Kenneth F. Dawalt has relieved **Brig. Gen. William T. Ryder** as Dep. Chief of Research and Development for International Programs in the Office of the Chief, Research and Development, U.S. Army. Gen. Ryder retires after 30 years of Army service.

Brig. Gen. Kenneth H. Bayer has been assigned as Dir. of Research and Development, U.S. Army Materiel Command, succeeding **Maj. Gen. William C. Gribble, Jr.**

Brig. Gen. Harold M. Brown has assumed duties as Dep. Chief of Communications-Electronics, Department of the Army. He succeeded **Brig. Gen. Lawrence P. Jacobs** who has retired.

Col. Warren R. King has been named Chief of Staff, U. S. Army Electronics Command, Fort Monmouth, N.J. **Col. George A. Kurkjian**, who has been serving as Deputy and Acting Chief of Staff, will continue as Deputy.

Col. Willard Roper is slated for assignment as Dep. Dir. of Civil Works in the Office of the Chief of Engineers this summer. He is now serving as District Engineer at Louisville, Ky.

Col. Max McCord will succeed **Col. Edwin J. Withers** as Dir. of Real Estate in the Office of the Army Chief of Engineers, Washington, D.C. Col. Withers retired in November. **W. L. Berge** has been serving as Acting Director since the colonel's retirement.

Maj. Gen. Glen R. Birchard has been picked to head the Air Force Alaskan Command. He will take command Aug. 1 and is nominated for promotion to the rank of lieutenant general.

Brig. Gen. Edward W. Scott, Jr., will become Commander, European Exchange Service, in July. He is now serving as Commandant, Air Command and Staff College, Maxwell AFB, Ala.

Col. Donald W. Bowry has been reassigned as Chief, Communications and Electronics Div., Directorate of Aerospace Programs, Headquarters, USAF.

Col. Leonard K. Carson has been named Dir. of Research Programs in the Office of Aerospace Research.

Col. James R. Carter, now serving with the Pacific Air Force, has been selected as Chief, Advanced Programs Office, F-111 Special Project Office, Aeronautical Systems Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.

Col. Dan McKee, former Commander of Space Systems Divisions' Detachment 2 at Houston, Tex., has assumed a new role as Dep. for Unmanned Systems, Space Systems Div., Air Force Systems Command, Los Angeles, Calif.

The Electronic Systems Div., Air Force Systems Command, L. G. Hanscom Field, Mass., announces the following changes:

Col. Emmett V. Conkling has been reassigned as Chief of the newly established Directorate of Communications Development. **Col. Robert L. Edge** has been named to relieve Col. Conkling as Dir. of the 473L USAF Command and Control System Program Office. **Col. Robert J. Kuehn**, now serving as Dep. for Command Systems, has been reassigned to the Joint U.S. Military Systems Group in Thailand. Col. Kuehn will be succeeded by **Col. Paul G. Galentine** who moves from his present position as Dep. for Engineering and Technology. **Col. Roy Morgan** will serve as Acting Dep. for Engineering and Technology.

DEPARTMENT OF THE ARMY

Dr. Marvin E. Lasser has succeeded **Dr. Harold C. Weber**, as Chief Scientist in the U. S. Army's Office of Research and Development.

Lt. Gen. William B. Bunker, Dep. Commanding General, Army Materiel Command, was promoted to his present rank during ceremonies held in Washington, May 9.

The Army's top computer manager, **Maj. Gen. J. E. Landrum**, will retire July 31. He will be replaced in the position of Special Asst. to the Chief of Staff (Information and Data Systems) by **Brig. Gen. Charles P. Brown**, who has been designated for promotion to major general.

Brig. Gen. John R. Guthrie has been appointed Dir. of Developments in the Office of the Chief of Research and Development, U. S. Army.

Brig. Gen. Thurston T. Paul, Jr., has been selected as Dir. of Plans and Programs in the Office of the Chief of Research and Development.

Brig. Gen. Edwin L. Donley has assumed command of Land Combat Systems at the U.S. Army Missile Command, Redstone Arsenal, Ala. Gen. Donley was promoted to his present rank upon taking command.

DEPARTMENT OF THE NAVY

RAdm. Harry J. P. Foley, Jr., SC, Dep. Commander for Plans and Policy at the Naval Supply Systems Command, Washington, D.C. has been reassigned as Commanding Officer of the Navy Aviation Supply Office, Philadelphia.

RAdm. William F. Petrovic has been named Dep. Commander for Shipyards and Program Dir. for Shipyard Modernization at the Navy Ship Systems Command, Washington, D.C. He previously served as Commander, New York Naval Ship Yard.

DEPARTMENT OF THE AIR FORCE

Gen. Dean C. Strother, Commander-in-Chief, North American Air Defense Command/Continental Air Defense Command, is scheduled for retirement July 31, 1966. **Lt. Gen. Raymond J. Reeves** has been selected to succeed him. The new commander will assume his duties Aug. 1 and has been selected for promotion to four-star rank.

Army-Air Force Exchange Service Will Move to Texas

The U. S. Army and Air Force Exchange Service, now headquartered in New York, will be relocated to the Fort Worth-Dallas, Tex., area with the move scheduled to be completed by summer 1967.

The switch is part of a three-year improvement plan to modernize the Exchange Service. It is estimated that the program will result in savings of more than \$3 million a year.

The Exchange Service provides a world-wide service to the Army and Air Force by operating cafeterias, snack bars and sales and service outlets of various kinds at military installations in the United States and in 34 foreign countries.

(Continued from Page 4)

inappropriate while we are engaged in a shooting war.

But I believe precisely the opposite is the case. It is more appropriate now than ever. For it would underscore what our whole purpose is in Vietnam—and indeed anywhere in the world where coercion, or injustice, or lack of decent opportunity still holds sway.

It would make meaningful the central concept of security: a world of decency and development where every man can feel that his personal horizon is rimmed with hope.

Mutual interest, mutual trust, mutual effort—those are the goals. Can we achieve those goals with the Soviet Union and with Communist China? Can they achieve them with one another?

The answer to these questions lies in the answer to an even more fundamental question.

Who is man?

Is he a rational animal?

If he is, then the goals can ultimately be achieved.

If he is not, then there is little point in making the effort.

All the evidence of history suggests that man is indeed a rational animal, but with a near infinite capacity for folly. His history seems largely a halting, but persistent, effort to raise his reason above his animality.

He draws blueprints for Utopia, but never quite gets it built. In the end, he plugs away obstinately with the only building material really ever at hand: his own part-comic, part-tragic, part-cussed, but part-glorious nature.

I, for one, would not count a global free society out.

Coercion, after all, merely captures man. Freedom captivates him.

Small Business Success

(Continued from Page 5)

But the key to the success of Stencel Corp. is the fact that the Defense Department is not unapproachable for small companies, even in areas previously dominated by larger industries.

With this avenue of relationship open, new sources of expertise are continually being discovered by the Defense Department. And an inevitable product of this approach is the opportunity for a small business with competent people and original thinking to obtain the kind of work which will help it grow into a successful enterprise.

Advisory Committee To Study Maritime Competitive Bid Procedures

An advisory committee has been formed by the Navy to study and recommend means of establishing competitive bid procedures and cost analysis criteria for use by the Military Sea Transportation Service in dealing with the maritime industry. Formation of the group is in line with the recent ocean procurement policy statement of the Defense Department at a Federal Maritime Hearing held April 4, 1966.

The group will work closely with Vice Admiral Glynn R. Donaho, Commander, Military Sea Transportation Service. Members of the committee are:

Mr. Clarence Morse, Attorney, San Francisco, Calif. (Former Administrator, Federal Maritime Commission.)

Dr. Carl E. McDowell, Executive Vice President, American Institute of Marine Underwriters, New York City.

Mr. Alex C. Cocke, Marine Consultant, New Orleans, La. (Retired Vice President, Lykes Steamship Lines.)

Because of the general public interest in the maritime field, and recent Congressional hearings on the subject of ocean rates and procedures, the committee will evaluate alternative methods of developing competitive ocean rate structures applicable to the Military Services. To establish criteria for the taxpayer, the study group will furnish a format for analysis of cost data to insure the establishment of equitable rates for movement of military cargo.

It is also anticipated that establishment of this advisory committee will promote better understanding of ocean procurement problems under consideration by both military and industry.

Landing System Tested by Air Force

The Air Force is testing a new tactical approach and landing system called IRATE (Interim Remote Area Terminal Equipment) to be used in Southeast Asia.

The system, which will provide an interim letdown capability under low visibility conditions, is based on accelerated development and evaluation of off-the-shelf terminal equipment.

Capabilities of two systems are now being studied at the Air Force Instrument Pilot Instructor School, Randolph AFB, Tex., for use in cargo extraction, paratroop and approach for assault landing.

The two systems are the Tactical Landing and Approach Radar (TALAR) built by General Precision Laboratories and the Simplified Tactical Approach and Terminal Equipment (STATE) built by Honeywell, Inc.

The IRATE program was established by the Joint Service Tactical Approach and Landing Working Group and is under the technical management of the Air Force Flight Dynamics Laboratory of the Air Force Systems Command, at Wright-Patterson AFB, Ohio.

USAF To Contract for UFO Investigations

The U. S. Air Force is taking steps to strengthen its program for the investigation of reports of unidentified flying objects (UFO) by seeking the aid of scientific and educational institutions.

Aid will be sought through contracts calling for prompt, in-depth investigation of selected UFO reports. Air Force officials are now discussing the project informally with university and other scientific leaders to determine their interest.

Decision to award the contracts was based on a recommendation by the Air Force Scientific Advisory Board which reviewed the resources, methods and findings of Project Blue Book, the Air Force program to investigate and evaluate UFO reports.

In its report, which was submitted to the Air Force in March, the investigating committee recommended expanding the program to include investigation of selected sightings by independent scientists.

The Air Force is preparing work statements for the new contracts now. Funds for them will be requested from FY 1967 and FY 1968 budgets.

DEFENSE PRIME CONTRACT AWARDS TO SMALL BUSINESS

(Amounts in Thousands)

	July 65–March 66	July 64–March 65
Procurement from All Firms	\$22,771,684	\$17,501,728
Procurement from Small Business Firms	4,903,686	3,627,720
Percent Small Business	21.5	20.7

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Each Defense Procurement Circular is designed to place new or changed policy or procedures in effect prior to publication of an Armed Services Procurement Regulation (ASPR) revision. ASPR subscribers will receive DPC's and ASPR revisions through the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

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A Thermal Radiation Heat Source and Imaging System for Biomedical Research. D. L. Richardson, Arthur D. Little, Inc., Cambridge, Mass., for the Navy, Dec. 1965, 48 pp. Order No. AD-629 590. \$2.

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Government Research and development reports are available to science and industry at price indicated from:

Clearinghouse for Federal and Scientific Information
Department of Commerce
Springfield, Va. 22151

Authorized DOD contractors and grantees may obtain these documents without charge from:
Defense Documentation Center
Cameron Station
Alexandria, Va. 22314

The Minuteman Missile Power for Present and Future

by

Maj. Gen. H. J. Sands, Jr., USAF
Commander, Ballistic Systems Div.
Air Force Systems Command

When industry visitors to our Ballistic Systems Division (BSD) headquarters at Norton AFB, Calif., query us on what's new, the answer is mostly, "Minuteman."

In an era which may seem deceptively quiet after the days when we were deploying three different types of missiles simultaneously, the Minuteman has proved itself much more than the solidly established mainstay of our present operational missile strength. It is demonstrating that it is also the best grafting stock developed to date in our United States missile program. Its remarkable potential for improvement bids fair to make this latest and liveliest of our long-range aerospace weapons the Methuselah of U. S. strategic missiles—with the difference that longevity does not mellow, but magnifies, its capabilities.

This capacity for flexible evolution makes the Minuteman not only continuing news, but a one-package summary of technological trends and progress at any given time. Indeed, a major problem, since development of the system was begun in 1958, has been to freeze its evolution even long enough to get an operational force deployed. Consideration of present Minuteman development and planning is one of the most effective means of getting a bird's eye view of significant trends in ballistic system weaponry. The Minuteman accurately reflects both the remarkable accomplishments of industry in missile technology, and the continuing emphases and needs of the Air Force.

We now have an operational Minuteman force of better than 800 missile systems on operational alert. Work is progressing steadily on the activation of additional units to be equipped with an advanced version of the weapon, the Minuteman II.

The Minuteman II, currently being tested with excellent results at Cape Kennedy and Vandenberg AFB, incorporates the results of major advances of the past several years in missile technology. A great-

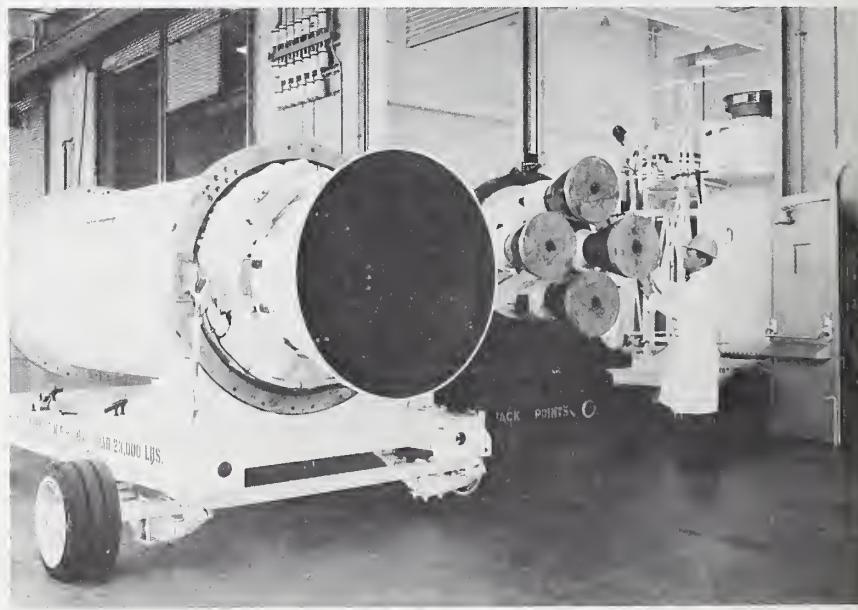
ly modified guidance and control system features microminiaturized electronics and gives the missile twice the accuracy of Minuteman I. The missile will have a new capability for launch by signal from SAC's airborne command post. Modification of the ground environment decreases the vulnerability of the weapon system to enemy attack. Greater flexibility of targeting has also been built into this new version of the Minuteman.

The most fundamental change in the Minuteman II, however, is its second-stage engine with a larger engine chamber loaded with an improved propellant which delivers nearly 50 percent more total energy. End result of this and other propulsion improvements is an increase of more than 2,000 miles in the range of the missile or an option for a significant increase in payload.

The first five wings of our Minuteman force are scheduled to be converted from the Minuteman I to the Minuteman II in a billion dollar force modernization program which is just getting under way. The existing silos and ground equipment with necessary modifications will be used for the Minuteman II missiles. At a fraction of the cost of deploying a new weapon system, we will be able to graft upon the Minuteman I stock modification which, in actual fact, will give us the capabilities of a new, greatly advanced weapon system.

And now, waiting in the wings for development and announced by President Johnson in his January budget request to Congress, is the Minuteman III.

Even the Minuteman cannot go on forever, of course. To attempt to push too far reliance upon its adaptability would be a dangerous delusion. The time must inevitably come when the state of the art bursts the seams of the whole missile system as originally conceived, when modifications overwhelm the original configuration and are no longer practical, and a total new integrated approach is needed. That is why we have already begun studies on at least two other missile systems to supplement or supersede the Min-



The size of the second stage solid propellant rocket motor of the new Minuteman II ICBM is compared with the smaller second stage motor for Minuteman I. The Minuteman II unit, with its single nozzle, is larger, more powerful and has a greater range than the older four-nozzled model. The older vehicle is steered on command, while Minuteman II is maneuvered by liquid injections into the nozzle which deflect the exhaust stream.

uteman, depending upon developments.

Any missile which succeeds the Minuteman, or supplements it in years to come, will be the direct lineal descendant of the "instant missile" in most significant respects. Many of the technological building blocks which will be used in future missiles are being developed now for the Minuteman, are being put to the test in its successive versions, and refined and re-designed in the light of our advancing experience with the "ace-in-the-hole."

Propulsion advances, for instance, which account for the greatly extended range of the Minuteman II, foreshadow even more significant developments of the near future. The new propellant, which has the jaw-breaker name of carboxy-terminated polybutadiene, has a much higher specific impulse than the solid fuel used in earlier versions of the missile. Its greater punch is further augmented by the use of a single nozzle, which is more efficient than the previous four nozzles, and by a liquid injection thrust vector control system for control of the missile during second-stage operation. This last

makes the missile more quickly responsive to the commands of its guidance and control system.

Of course, our work in propellants goes far beyond what is embodied in present versions of the Minuteman. We are also investigating both larger and small propulsion systems, and doing extensive nozzle research. We are studying storable metallized thixotropic fuels—jelled propellants holding metal powder in suspension—which combine some of the best properties of solid and liquid cryogenic fuels. We are exploring adaptation of the Polaris "cold launch," i. e., propelling a missile from the silo by gas and igniting it in the air. The launch site chosen for our work with cold launch techniques to date is a Minuteman silo.

The Minuteman II also reflects the active research going forward today to develop new materials for high temperature ballistic system applications and light-weight materials of great tensile strength, special shielding properties against radiation and special qualities for minimum radar "observability." In the gimbal structure of the Minuteman II, for example, we have the first large usage of

beryllium, the lightest in weight of all stable metals, much lighter than steel, yet stronger.

In the area of guidance and control, too, one of the highest pay-off areas in terms of mission effectiveness, the Minuteman II is a trail blazer. In addition to the tremendous savings in weight and bulk, the microminiaturized integrated circuits of the system create the "most performance per pound" we have yet been able to condense into a missile system. A modified guidance and control coupler is the electronic link between the missile's digital computer "brain" and the missile combat crew located in a launch control facility.

Though Minuteman II's guidance system doubles the accuracy of the missile, we are still pushing for improvements through such additional aids to the basic inertial guidance system as radio, stellar tracking and terminal guidance.

One of the most active areas of progress in the ballistic missile effort is re-entry technology. At Ballistic Systems Division headquarters we run a joint Air Force-Army-Navy program called ABRES (Advanced Ballistic Re-Entry System). Of all our individually designated programs, ABRES, next to the Minuteman itself, receives the largest share of our BSD resources and energies.

Its purpose is to develop the technological base for progressively improving the capabilities of our re-entry systems. Unlike "new wine in old bottles," a new re-entry system on an "old" missile can be an economical route to great gains in mission capability. Among the major efforts in this program are:

- Improving the material makeup of re-entry systems to survive the natural hazards of re-entry into the atmosphere.
- Improving the accuracy with which the system finds its target.
- Devising decoys and other means of evading or confusing enemy anti-missile action.
- Increasing the effective payload which can be delivered by each missile launched.

A special four-stage, sub-scale missile, the Athena, has been developed to test new re-entry system concepts and designs. It is launched from heavily instrumented facilities at Green River, Utah, to impact on



The first stage motor for the Athena test missile is maneuvered in position on launching tracks. It will be mated with the second stage, then finally with the accelerating package which carries the third and fourth stages and the needle-nosed re-entry vehicle. This is a scaled down model of an intercontinental ballistic missile (ICBM) nosecone in which various types of warhead aids are tested.

the test range at White Sands, N. M. Full-scale testing is done with modified Atlas boosters launched over the Western Test Range out of Vandenberg AFB.

The Minuteman has been our No. 1 "customer" for ABRES and industry re-entry system developments. With each successive re-entry system the weapon system as a whole has taken on a different character and increased capabilities. We have Minuteman missiles with three different re-entry systems in our presently deployed operational force. The Mark 12 re-entry system will be one of the major improvements in the future. The Mark 17 re-entry vehicle is intended for use on both the Minuteman II and III. The excellent results which can be obtained by grafting improved re-entry system capabilities upon the Minuteman are an important factor in keeping the weapon system abreast of our defense requirements far beyond the normal life expectancy of such a system in today's climate of rapid technological evolution. When we do finally retire this hardy little Methuselah of missiles, it will leave to its successors, as an invaluable "building block," a decade of concentrated, practically tested progress in the re-entry field.

The Minuteman promises to have as many lives as a cat. And in each one of them it is making a contribution to both our present and our future deterrent defenses.

New Directive Covers Unauthorized Disclosure

Policies and procedures for the investigation of unauthorized disclosure of classified defense information are clarified in a new instruction designated DOD Directive 5210.50.

The directive, in part, states that the keystone in the security classification structure is the original classifier.

Not only is the original classifier responsible for the classification but he also maintains an obligation for downgrading and declassification as well.

For example, when a compromise or possible compromise of classified information is established, the original classifier must be notified immediately so that a re-evaluation of the information may be accomplished by him to determine whether the information is so compromised that downgrading or declassification is appropriate.

Economic Information System Reports Approved by Bureau of the Budget

The Bureau of the Budget (BOB) gave approval during May 1966 to the semi-annual contractor reporting requirements prescribed by the Department of Defense and National Aeronautic and Space Administration Economic Information System (EIS). BOB's approval followed extensive coordination with industry representatives by Defense and NASA officials.

The Economic Information System was developed jointly by DOD and NASA. The DOD effort is under the direction of Dr. Stephen Enke, Deputy Assistant Secretary of Defense (Systems Analysis) for Economics.

This system is one of several DOD projects designed to measure the economic impact of defense programs. Although the policy of DOD is such that economic impact will not influence program acquisition decisions, it is important that DOD as well as state, local and other organizations, take such actions as may be desirable to alleviate adverse consequences of shifts in defense procurement programs.

EIS originated in 1961 as part of an effort to assess the economic impact of defense procurement on plants and communities. In 1965 BOB gave approval for a one-time test of an earlier version of the present formats. These test formats were completed by approximately 200 contractors in 1965 under the DOD's Cost and Economic Information System (CEIS) that has since evolved into the Selected Acquisition Information and Management System (SAIMS).

The new SAIMS includes the Economic Information System and the Cost Information Reports. The latter was approved by BOB in April 1966. Using the experience gained from the 1965 test, the new economic report formats have been simplified both in content and scope to provide the minimum essential information required for measuring impact.

Contractor reports under EIS consist of the Plantwide Economic Report and the Individual Project Economic Report. The Plantwide Report provides

data on total employment according to four major categories—DOD, NASA, Other Government, and Commercial.

The Individual Project Report provides data on employment, costs, cost distribution over time and contract information, and will be prepared for each individual project (major weapon system or major element thereof) having 150 or more direct workers on the project.

One of the series in the Defense Contractors Planning Report (DCPR), the DD Form 1401 (Plant Data), is deleted as a reporting requirement by EIS.

Report forms and instructions were mailed to approximately 500 plants during May 1966. Completed reports were to be submitted within 30 days of receipt. This first report will contain actual data for the six month periods ending June 1965 and December 1965 and forecasts of firm business based on contracts awarded through April 30, 1966.

Although both the Economic Information System and the Cost Information Reports are designed to collect data on weapon systems development and production, they have distinctly different purposes and orientation.

The cost reports will provide data for estimating the cost of weapon systems (see "An Analysis of Cost Information Reports," *Defense Industry Bulletin*, April 1966). Generally, the cost reports contain more detail than the economic reports, collect data by individual contracts including selected lower tier inputs (vs. plant-wide totals for economic reports), and cover fewer plants and weapon systems than the economic reports.

Questions concerning the implementation of EIS should be referred to Arnold Franseen or Israel Rubin, Office of the Assistant Secretary of Defense (Systems Analysis), Room 3C-857, The Pentagon, Washington, D.C. 20301, phone (Area Code 202) OXFORD 7-6415.



MEETINGS AND SYMPOSIA

JULY

First International Conference on Hemorheology, July 10-16, at the University of Iceland, Reykjavik, Iceland. Sponsor: Office of Naval Research. Contact: Miss Suzanne Kronheim, Physiology Branch (Code 441), Office of Naval Research, Washington, D.C., 20360 (Area Code 202) OXFORD 6-1795.

National Classification Management Society 1966 Seminar, July 13-15, in Los Angeles, Calif. Non-members who desire to attend contact: Mr. Richard J. Boberg, Seminar Chairman, NCMS National Seminar, P.O. Box 2089, Culver City, Calif., 90230.

ICRPG/AIAA Solid Propulsion Conference, week of July 18, in Washington, D.C. Contact: Mr. P. J. Martin, Chemical Propulsion Information Agency, 8621 Georgia Ave., Silver Spring, Md., 20910. (Area Code 301) 589-7700, ext. 560.

1966 Annual Conference on Nuclear and Space Radiation Effects, July 18-22, at Stanford University, Palo Alto, Calif. Sponsors: Army Research Office, Institute of Electrical and Electronics Engineers, National Aeronautics and Space Administration, Office of Naval Research and the Air Force. Contact: Lt. Col. J. E. Houseworth, Physical Sciences Div., Army Research Office, Washington, D.C. (Area Code 202) OXFORD 4-3446.

Third International Pharmacology Congress, July 24-30, at University City, Sao Paulo, Brazil. Sponsors: Brazilian Federal Government, Government of the State of Sao Paulo, University of Sao Paulo and the U.S. Air Force Office of Scientific Research. Contact: Dr. Harvey E. Savel, (SRL), Air Force Office of Scientific Research, Tempo-D, 4th and Independence, S.W., Washington, D.C. (Area Code 202) OXFORD 6-6189.

AUGUST

Electron Spin Resonance Spectroscopy Seminar, Aug. 1-3, at Michigan State University, East Lansing, Mich. Sponsors: Army Research Office-Durham, Atomic Energy Commission, American Chemical Society and Michigan State University. Contact: Dr. David R. Squire, Chemistry Div., Army Research Office-Durham, Box CM, Duke Station, Durham, N.C., 27706. (Area Code 919) 286-2285.

1966 Linguistic Institute Conference on Linguistic Method, Aug. 1-3, at the

University of California at Los Angeles. Sponsor: Air Force Office of Scientific Research. Contact: R. W. Swanson (SRI), Air Force Office of Scientific Research, Washington, D.C., 20333. (Area Code 202) OXFORD 6-5374.

Eleventh International Symposium on Combustion, Aug. 14-20, at the University of California, Berkeley, Calif. Co-sponsors: Ballistic Research Laboratory and the Combustion Institute of Pittsburgh, Pa. Contact: Dr. R. J. Heaston, Physical Sciences Div., Army Research Office, 3045 Columbia Pike, Arlington, Va., (Area Code 202) OXFORD 4-3465.

Second Computer & Information Sciences Symposium on Learning, Adaptation and Control in Information Systems, Aug. 22-24, at Columbus, Ohio. Sponsors: Office of Naval Research, Battelle Memorial Institute and Ohio State University. Contact: Julius T. Tou, COINS Co-Chairman, Director, Communications Science Research Center, Battelle Memorial Institute, Columbus, Ohio, 43201.

Application of Generalized Functions to System Theory Conference, Aug. 25-26, at the State University of New York, Stony Brook, N.Y. Co-sponsors: Air Force Office of Scientific Research and Society for Industrial and Applied Mathematics. Contact: Capt. John Jones, Jr. (SRMA), Air Force Office of Scientific Research, Washington, D.C., 20333. (Area Code 202) OXFORD 6-1302.

Unguided Rocket Ballistics, Aug. 30-Sept. 1, at Texas Western College, El Paso, Tex. Sponsor: Army Electronics Research & Development Agency. Contact: V. C. Cochran, Army Electronics Research & Development Agency, White Sands Missile Range, N.M., 88002.

Logic, Computability and Automata, date and place undetermined. Co-sponsors: Hughes Aircraft Co. and the Rome Air Development Center. Contact: C. A. Constantino (EMID), Rome Air Development Center, Griffiss AFB, N.Y., 13440.

Ocean Electronics Symposium, Aug. 29-31, at Honolulu, Hawaii. Sponsor: Hawaii Section, Institute of Electrical and Electronics Engineers (IEEE). Contact: Robert R. Hill, Chairman, IEEE Ocean Electronics Symposium, Headquarters, 1441 Kapiolani Blvd., Suite 1320, Honolulu, Hawaii 96814.

SEPTEMBER

U.S. National Committee for Pure and Applied Biophysics in connection with the Second International Biophysics Congress, Sept. 5-9, in Vienna, Austria. Sponsor: Office of Naval Research. Contact: Mrs. P. H. Tenniswood, Code 444, Office of Naval Research, Washington, D.C., 20360. (Area Code 202) OXFORD 6-1538.

Symposium on Galio-Marinide, Sept. 26-27, in Wales and England. Sponsor: Research and Technology Div., AFSC. Contact: R. W. Runnels (AVN), Air Force Avionics Laboratory, Research and Technology Div., AFSC, Wright-Patterson AFB, Ohio, 45433. (Area Code 513) 253-7111, ext. 53802.

Sixth Annual National Conference on Environmental Effects on Aircraft and Propulsion Systems, Sept. 26-28, at Princeton, N.J. Sponsor: Naval Air Turbine Test Stations. Contact: Dennis A. Wysocki, Conference Vice Chairman, Naval Air Turbine Test Station, P.O. Box 1716, 1440 Parkway Ave., Trenton, N.J., 08607. (Area Code 609) 882-1414, ext. 355.

Sixth Symposium on Naval Hydrodynamics, Maneuverability, Waves and Physics of Fluids, Sept. 29-30, Oct. 3-4, at Washington, D.C. Sponsor: Office of Naval Research. Contact: Mr. S. W. Doroff, Office of Naval Research, Code 438, Washington, D.C., 20360. (Area Code 202) OXFORD 6-1433.

OCTOBER

Tenth Annual Organic Chemistry Conference, Oct. 4-5, at Natick, Mass. Co-sponsors: Army Natick Laboratories and the NAS-NRC Advisory Board on Military Personnel and Supplies. Contact: Louis Long, Jr., Head, Organic Chemistry Laboratory, Army Natick Laboratories, Natick, Mass. (Area Code 617) 653-1000, ext. 414.

Colloquium on the Photographic Interaction Between Radiation and Matter, Oct. 26-27, at Washington, D.C. Co-sponsors: Air Force Office of Scientific Research and the Society of Photographic Scientists and Engineers. Contact: Dr. Amos G. Horney (SRC), Air Force Office of Scientific Research, Washington, D.C., 20333. (Area Code 202) OXFORD 6-8705.

Packaging Courses Open To Defense Industry

The Joint Military Packaging Training Center, Aberdeen Proving Ground, Md., has announced that industrial representatives will be accepted for enrollment in the extension course program.

Industry students should be supervisory level personnel, packaging specialists, or packaging engineers. Enrollment is limited to business concerns which have contracts with the Defense Department.

Training covers the approved DOD policies, methods and techniques of military preservation, packaging, packing, inspection, loading of military supplies and equipment, and specialized courses as established by current Government specifications and other military directives.

For information contact: Director, Joint Military Packaging Training Center, Attn: AMXPT-A, Aberdeen Proving Ground, Md. 21005, phone (Area Code 301) 272-4000.

Courses available are:

Course Number & Title	Length
8B-F1(JT)—Preservation & Intermediate Protection, Phase I.	2 weeks
8B-F2(JT)—Packing & Car-loading, Phase II.	2 weeks
8B-F4(JT) — Basic Packaging.	2 weeks
8B-F3(JT)—Preservation & Packaging, Phase III.	1 week
8B-F5(JT)—Missile Packaging.	2 weeks
8B-F6(JT) — Equipment Preservation for Shipment or Storage.	2 weeks
8B-F7(JT)—Preparation of Freight for Air Shipment.	1 week
8B-F8(JT)—Inspection of Packaged & Packed Household Goods for Storage & Shipment.	1 week
8B-F4(JT)—Packaging Administration.	3 days
8B-F16(JT) — Packaging Design	2 weeks

Army To Get New Portable Combat X-Ray Units

Army medics will soon have the help of X-Rays in treating combat wounds right on the battlefield through the use of a new lightweight X-Ray unit and a portable, spring-drive X-ray polaroid film processor. Designed for rugged use by forward area medical units, both pieces of equipment have been tested successfully in Vietnam under combat conditions.

Air Force Expands BUIC Aerospace Control System

The Air Force has launched a development program aimed at strengthening the nation's secondary aerospace control system known as BUIC (Back-Up Interceptor Control).

BUIC's D825 electronic computers, which provide a high-speed surveillance and control system furnishing up-to-the-minute information on airborne threats to the North American continent, will be enlarged under the program and additional TV-type display consoles added at each site to increase defense posture.

BUIC is a stand-by, monitor system which automatically takes over the continental air defense task if the Air Force's primary system, SAGE (Semi-Automatic Ground Environment), becomes inoperative.

To accomplish the expanded capability of BUIC the Air Force Systems Command's Electronic Systems Division has awarded a \$14,050,000 contract to the Burroughs Corp. of Paoli, Pa.

Overall management of the BUIC program is provided by the 416M System Program Office headed by Colonel Frank L. Ayres, at the Air Force Systems Command's Electronic Systems Division, L. G. Hanscom Field, Mass. Systems engineering is provided by the Mitre Corp. and computer programming for the system by the System Development Corp.

AIR FORCE AND FAA DEVELOP ALL-WEATHER LANDING SYSTEM FOR C-141

An all-weather landing system, developed jointly by the U.S. Air Force and the Federal Aviation Agency, will be installed on all C-141 Starlifters. The new landing system will enable the huge fanjet cargo-troop carriers to land safely under adverse weather conditions, at both improved airfields and in remote or combat areas where a minimum of ground-landing aids may be available.

The system, while similar to those in use in commercial aircraft, is more complex because it must be more nearly self-sufficient. Its basic function is to program the aircraft's flight path, speed, angle of approach and attitude at various points in the approach and touchdown path. The system will generate and provide the necessary information either to the pilot, who then flies the proper path and speeds, or to the autopilot which flies the plane automatically.

DOD Technical Term Glossary Available

The Defense Department has issued a new glossary of scientific and technical terms used in its technical data and standardization programs.

Under the title "Department of Defense Technical Data and Standardization Glossary," the new manual is based on several previous but less comprehensive compilations and includes terms found in directives, instructions, regulations and orders relating to these programs.

Copies of the glossary are available to industry representatives by order from the U.S. Naval Supply Depot 5801 Tabor Ave., Philadelphia, Pa. 19120.

Navy Authorized Data List

(Continued from Page 9)

forms for common DOD data items, considers that use of standard generalized data forms may not be practicable for coverage of many uncommon data items when such items are adequately covered by existing source documents. Further, standard generalized data forms may not be practicable for data requirements covered by coordinated DOD specifications.

Industry's assistance is needed in the undertaking and coordination of the DADL. With adequate support from industry, the Navy feels confident that the task group will develop a practical and useful DOD Authorized Data List.

Equal Employment Opportunity

(Continued from Page 10)

ter or spirit of company policy by any employee shall result in disciplinary action including, where appropriate, termination of employment.

While a great deal remains to be done in carrying out the terms of the agreement its effect has already been noted. The National Association for the Advancement of Colored People has referred to the agreement as "exemplary." Donald A. Holden, president of the Newport News Shipbuilding and Drydock Co., stated, "We are proud of our part in working out this agreement." He added that the agreement represented an effective and responsible effort to achieve genuine equality of opportunity for Negroes.

"Echo" Revision of MIL-P-116 Published

by

Oscar Gayle

Joint Military Packaging Training Center
Aberdeen Proving Ground, Md.

Have you ever had trouble distinguishing between the letters Bee, Cee, Dee and Eee? You are not alone—so have the Military and Government Services. The international phonetic alphabet adopted after World War II further clarified the system to reduce the audible misunderstanding of those letters that sound alike and has proved very effective.

Packaging procurement and operations are keyed directly to our specification system, whose revisions and amendments are indicated by many same sounding letters, so we want to make it clear that MIL-P-116 "Echo" has arrived. After extended discussions, Service-wide coordinations and compromises, the "Echo" revision of MIL-P-116, "Preservation, Methods Of," was published Nov. 1, 1965, superseding MIL-P-116 "Delta" dated Sept. 29, 1960.

To those engaged in military packaging, this revision is very important as the new specification includes several major changes which will have wide impact.

Deletions and additions have been made to the list of P-type preservatives and methods of unit protection, and significant changes have been made in the quality assurance provisions. Because of these changes, the list of applicable documents, section 2 of the specification, also had to be revised.

One of the most evident changes in MIL-P-116E is in table I the listing of military approved temporary preservative compounds. Five long familiar preservatives have been deleted. They are the petrolatum based compounds P-4 and P-5 (classes 2 and 3 of MIL-C-11796); one rust inhibited oil, P-8 (MIL-L-3503); one special preservative for brightwork, P-13 (MIL-W-3688); and the thixotropic oil, P-16 (MIL-C-5545). P-19, identified as grade 4 of MIL-C-16173, was previously added by Amendment No. 1 to MIL-P-116; and this latest revision adds P-20, lubricating oil, contact and volatile corrosion inhibitor treated. This preservative oil should turn out to be one of our most useful preservatives, especially in the preparation of vehicles for storage, as the VCI vapors will penetrate to almost inaccessible areas and greatly enhance the overall protection of many critical parts.

Here we can recognize definite

signs of progress in preservation techniques. Hard drying, gummy compounds, difficult to apply and still more difficult to remove, are giving way to multipurpose, easy-to-use, preparations which are more than equivalent in their protective abilities.

Another far-reaching change which also reflects current technology in the state of the art is in the section of methods of unit protection. Here we find that not only have five rarely used submethods of packaging been deleted and two new ones, which embody the latest in packaging techniques, added but a whole new family of packaging materials has been included. These are the unsupported plastic films of Military Specifications MIL-F-22191.

The submethods that have been deleted are IA-1, IA-2, IA-7, IC-5 and IC-6. IA-1 and IA-2, the wax-dipped packages, have proven to be quite expensive to fabricate as they require a good deal of manual labor. There has been no question as to the effectiveness of these packages; but, aside from being costly, the protection they afford is duplicated by the IA-8 and the IA-15. The IA-7, vacuum pack, is now designated as an optional variant of the IA-5, the all-metal sealed container.

The submethod IC-5 package, a water-resistant fiberboard box, sealed, has been redesignated as a method I (if a preservative has been used on the item) or a method III (if no contact preservative has been used).

Submethod IC-6 has not been proven any more effective than the IC-1, the IC-3 or the IA-8, any of which would be acceptable substitutes.

The two added submethods, IC-7 and IC-8, are especially adaptable to the packaging of bearings and other small critical parts.

Submethod IC-7 consists of a compartmented heat sealed plastic package made of a rigid cellulose acetate, cellulose acetate butyrate, or cellulose propionate. Each compartment holds one item which has been dipped in preservative oil. The compartments are separated by score lines, making it an easy matter to break off one compartment while leaving the remainder intact.

The IC-8 is designed for the plastic packaging of larger items of regular shape. A plastic cup is formed,

again using one of the materials specified for the IC-7 above, which allows a minimum clearance for the item. The item, dipped into a preservative oil, is placed in the cup; and a telescoping cup is formed to close the package. The seam is chemically sealed by the use of a plastic solvent.

This change does not reflect the only use of plastics in packaging that occurs in MIL-P-116E. Polyethylene film (L-P-378) and types I, II, and III of MIL-F-2211, transparent packaging film, are included in many of the submethods as acceptable substitutes for the opaque packaging materials that have been specified in the past.

The advantages of transparent plastic packaging have been recognized by industry for many years. In the past few years some military contracts have specified the use of plastic bags and wraps, and some of the military organizations have used them extensively.

With the development of the water-vaporproof, greaseproof film that complies with the requirements for type I of MIL-F-22191, it is now possible to use transparent plastic films over the whole spectrum of protection from method III, which is designed for mechanical and physical protection only, to the highly water-vaporproof desiccated package of method II. Films conforming to types II and III of this specification afford moderately water-vaporproof and greaseproof protection (type II) and waterproof (type III).

Although types I and II are relatively expensive, they will find many uses where transparency and reduction of tare weight are factors. While inspection requirements have not been drastically changed, users of MIL-P-116 will find that the specific tests are no longer detailed in the specification but are included by reference to the appropriate tests of Federal Test Method Standard No. 101. This is in keeping with the Department of Defense Standardization Program which requires that detailed information will not be duplicated from document to document.

Procurement personnel, packaging engineers and packagers will find that MIL-P-116E is a much broader specification than its predecessors and is a forward pointing sign post along the road to better, less costly packaging.

Military Exports

(Continued from Page 7)

maintain a reasonable stability through balance of forces as they are a problem of considering the effects of over \$750 million in arms poured into Egypt by the Soviets through 1964.

Problems from a Protectionist Point of View.

Finally, I would like to cover the problem of military exports in terms of world affairs by examining a problem which manifests itself in Europe and, particularly, in the consideration of the U. K. aerospace industry. I suppose we could say that no one objected about military exports during the 1950's when the foreign assistance program was paying for it and, therefore, no one can properly object to such exports now. However, there are always people who view their problems from a protectionist point of view. We know such men exist here and they also exist in Europe.

We would not wish to react to these protectionist interests in Europe from a narrow view of our own. The result would certainly be counter productive to our own military export efforts and would make it increasingly difficult for defense ministers interested in increasing defense return for economic investment to buy from the United States. We have much broader interests—interests which will require the U. S. response and approach to be as ingenious as it is vigorous. We must establish by our actions in Government and industry that there is merit in an orientation towards the United States. We must sell the benefits of collaboration in defense matters with competition. We must demonstrate that the free world has more to gain from the U. S. model of defense competition than it has from the temptation to allocate the market and build little, safe, high-cost arrangements across national borders.

These are problems that we must all work on—problems that we have not resolved, problems which the policy management of our Government and our industry must consider.

A recent UK aircraft industry report is indicative of the frustrations and consequent protectionism that is arising in Europe. I would like to cite some of the more significant ele-

ments of that report which exemplify the problem:

- After dealing with the character of the aerospace industry as one involving heavy investments of research and development and tremendously expensive products in terms of the past, the UK report states (a) that the U. S. aircraft industry output per man is estimated at three to three and a half times that of the United Kingdom; (b) that the U. S. pay is two and a half times that of the United Kingdom; and (c) that the U. S. worker has three to three and a half times as much fixed assets supporting him as the UK worker.

- After continuing an examination of relative production runs between the United States and the United Kingdom, the UK report notes that the United States buys 75 percent of free world military and space production and 50 percent of the free world civilian production, that the United Kingdom buys one-twelfth as much as the United States, and that the United Kingdom plus the common market buys one-fourth as much as the United States.

- The UK report notes the major factor in the success of the U. S. foreign sales program is early delivery—U. S. delivery generally reduces development by one year relative to that of the United Kingdom. They note lack of productivity in their industry, excessive delay in delivery, insufficient export promotion, inadequate market research and general governmental obstacles as the reasons for their difficulties—although they have just pointed out that they sell more abroad than does the United States.

A leading American manufacturer was with me recently in London and, in speaking to some key representatives of the United Kingdom, heard this intonation of fear against the American aerospace industry. He told me that up until that moment he just had never even thought about an American industry competing with a UK industry. He said that he spent all his time figuring out ways and means to compete with the Boeing's, the Douglas's, the Lockheed's, the North American's, the General Dynamics's and the McDonnell's. He said to our British friends that, if they really wanted to do business in the aerospace world, they had better

start worrying about the specifics of competing with companies, since there was no American aerospace industry with which they were competing.

This is only the surface of the problem. The UK aircraft report did go far enough to make an analysis of the net tariff rate that was being applied by the following protectionist lines. The report noted:

On the basis of an annual development investment of 100 million pounds and an annual aircraft production of 320 million pounds, and assuming a U. S. production cost 90 percent that of the United Kingdom, the United Kingdom could have acquired 420 million pounds of production from the United States at a production cost of 288 million pounds and a development cost of 33 million pounds. This cheaper U. S. alternative is equivalent to a tariff of 99 million pounds, or just over 30 percent. If U. S. production cost is assumed to be 80 percent of UK production cost, the equivalent "tariff" is \$7.56. These tariffs are probably understated since the United States sells abroad its more successful aircraft which have longer production runs and higher learning-curve savings, e.g., the Phantom run is about nine times that of the Lightning. The committee concludes that the UK aircraft industry has been subsidized too much; there are very few modern tariffs higher than 15 percent. Domestic production of the TSR-2, which would have cost \$15.4 million each, or more than twice that of the F-111, would have reflected a tariff of more than 100 percent.

Even with this advanced view of the situation, the report concluded that cooperation with the United States is ruled out for the following reasons:

- The United States has no need for cooperation since the U. S. aircraft industry would be able to meet all requirements.

- The United States is not likely to even buy UK aircraft as a *quid pro quo* for UK purchases.

If this type of reasoning were applied to all industries and companies, the conclusions would be disastrous for the United Kingdom. Neither of

these conclusions reflect the recognition for competition as a social need—competition with the best, not with the second best, to improve the potential of any industry. Even the second conclusion on the UK likelihood of U. S. buying UK aircraft does not reflect the desire to ask for competition with the United States, but merely says there will not be enough *quid pro quo* allocation of the market.

What do we do about this situation and where do we go from here? I do not profess to know all the answers and the Government has not adopted a specific solution or has not identified any specific remedy to the problem. We have too much at stake in terms of our military export relations to world affairs to stick our head in the sand like an ostrich and, to use an old cliche, we know we must adopt a position of enlightened self-interest.

First, we have centered our concept on a competitive economy system similar to our own and similar to the concept inherent in any common defense market. Such a system would strive for the development of international relations between ourselves and certainly with nations who have placed such extensive dependence on American industry based on these principles:

- The development of an efficient, lowest possible cost, highest possible quality defense industry.
- Minimum barriers to the free flow of capital, technology, skills and products for the defense industries within the free world.
- Development of an effective specialization with the result that the defense producers in each country apply themselves to those areas of fabrication in which they have the greatest capable efficiency.

• Exploitation of the “economy of scale”—first on a selective basis and then in broader ways.

• Development of a network of industry-to-industry relationships and technical associations.

Secondly, we believe the job of Government is to try to maintain the proper policy environment for such competition by industry; to move ahead in specific selective projects with industry in the next few years to test out the operating principles. A common defense market after all

in its purest form probably does not exist anywhere in the world. A common defense market in practical living form, however, is the process of striving to increase the flow of technology, capital, labor and production across borders with minimum interference for the specific purpose of improving the product returned for the effort expended.

Such action will tend to support the most efficient producers and not support all of the independently subsidized producers in separate countries. It will not be surprising, therefore, to see some allied industries, barely maintaining themselves on a highly subsidized basis, opposed to the idea of a common defense market. I do not think these people are to be criticized for we, too, from time to time as this matter develops will have to consider carefully the necessary position of our own industries.

However, on balance it is my opinion, derived through extensive discussions with U. S. manufacturers, that the highly competitive approach that has been taken here in the United States, particularly as a result of Secretary McNamara's cost reduction program, places the U. S. industries in fit condition for competition throughout the world. The large buying of defense production by our allies in the United States has proved this point. In spite of what one may hear from time to time, this buying has been the result, not of super salesmen, but of an increasing number of super buyers throughout the world. Governments have increasingly insisted on purchasing defense materials at the lowest possible cost and, thereby, saving literally billions of dollars for their taxpayers.

With these kinds of defense objectives in mind, we are prepared to proceed pragmatically on the defense common market with these super buyers. In examining our actions and policies, we have made it clear that no policy adopted by us will have support or foreign credence unless it is rooted in our own self interest. We have also recognized that self interest does not require that it be solely profitable to this country and be a one-way street. In fact, our very successful defense export programs will be increasingly counter productive without the acceptance of the same concept of free flow of trade

which dominates international commercial markets. The common defense market idea is simply a recognition of this fact and proposes an enlightened method of its implementation. In the specific case of the United Kingdom we have recently agreed to consider the procurement of British equipment for U. S. defense forces in an amount of about \$300 million. Such procurement, however, will be carried out in competition with U. S. sources so that the United States will buy from the United Kingdom only when the UK item is competitive in cost and quality.

Thus, in this way DOD believes it is in the interest of the free world to develop a gradual case-by-case pattern of a defense common market. Looking at a long-range aspect, I see no reason to change my earlier estimates which were:

- First, in the next 10 years I expect that our allies may purchase a minimum of \$10 to \$15 billion of their requirements from the United States by sheer virtue of the fact that defense common market principles will be operative among the leading purchasing defense ministries whether we have a formal market or not.

- Second, I expect in the next 10 years that some \$5-\$10 billion of combined U. S. and allied requirements may be handled through international production and development programs. While this amount is small compared to the \$200 billion which the United States will be spending during that period, or the total of \$100 billion spent by other free world countries, it is an amount which will be the largest total of common production and development that has ever occurred in the history of the world.

- Third, proceeding in these practical ways to resolve our problems, we and our allies will place in position for the 1980's a new breed of industry engineer-diplomat practiced in the tasks of using the defense common market approach to harmonize allied military requirements and production to an extent not ever seen before in the field of vehicles, armor, missiles, aircraft and electronics.

I hope this information will be helpful and that industry will find many more ways and means than I have described to participate in world affairs through military exports.

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	31					

S	M	T	W	T	F	S
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JUNE 1966

JULY 1966

AUGUST 1966

SPEAKERS CALENDAR

DEPARTMENT OF DEFENSE

Adm. Alfred G. Ward, USN, U. S. Representative to NATO Standing Group and Military Committee, at Independence Day Celebration, Birmingham, Ala., July 4.

DEPARTMENT OF THE ARMY

Gen. Harold K. Johnson, Army Chief of Staff, at Jaycee Prayer Breakfast, Detroit, Mich., June 29.

Gen. Frank S. Besson, Jr., Commanding General, Army Materiel Command, at ceremony marking production of first XM551 General Sheridan Vehicle, Army Tank Automotive Plant, Cleveland, Ohio, June 29.

Maj. Gen. W. J. Sutton, Chief, Army Reserve, at Reserve Officers Assn. National Convention, New York City, June 29.

Maj. Gen. B. F. Taylor, Director of Army Budget, Office of the Comptroller of the Army, at Army Comptrollership School, Syracuse University, June 29.

Lt. Gen. Robert Hackett, Comptroller of the Army, at Army Comptrollership School, Syracuse University, July 1.

Main Battle Tank Program Enters New Phase

The joint United States/Federal Republic of German (FRG) Main Battle Tank program will enter a new phase with the building of pilot models and testing. The management of this phase will shift from the Keller & Knappich plant in Augsburg, Germany, to the General Motors Technical Center, Warren, Mich. U. S. prototypes will be built at the Army Tank Plant in Cleveland, Ohio, and an equal number of FRG prototypes will be built in Germany.

Start of the new phase marks a milestone achieved in the unique two-nation tank development program, which was initiated under an agreement between officials of the United States and Germany in August 1963.

The agreement created an international two-man Program Management Board to execute a joint effort to design a single tank, producible in either country. Major General W. G. Dolvin, USA, was appointed the U. S. member and Dr. Fritz Englemann, the German member.

The board is now preparing plans for advance production engineering of the final model. All costs are shared on a fifty-fifty basis.

To assist in executing the agree-

Brig. Gen. Andrew P. Rollins, Asst. to the Chief of Engineers for NASA Support, at Society of Professional Engineers meeting, Corpus Christi, Tex., July 1.

William P. Durkee, Director of Civil Defense, at Governors' Conference, Los Angeles, Calif., July 4-7.

Brig. Gen. Harry G. Woodbury, Dep. Dir. of Civil Works, Office, Chief of Engineers, at Southern Water Resources Conference, Houston, Tex., July 18.

DEPARTMENT OF THE NAVY

RAdm. E. E. Christensen, Dep. Commander for Plans and Program, Air Systems Command, at Design for Maintainability Conference, Statler Hilton Hotel, New York, N. Y.

DEPARTMENT OF THE AIR FORCE

Maj. Gen. M. C. Demler, Commander, Research & Technology Div., Air Force Systems Command, at Space & Ballistic Missile Technical Symposium, Air Force Academy, Colo., July 6-8.

ment, the Program Management Board first retained the services of Lockheed Missile & Space Co. to run a Parametric Design/ Cost Effectiveness Study and created a Joint Engineering Agency (JEA) composed of Government personnel to break out and then review design tasks, guided by input from the Lockheed study.

Concurrently, each nation selected a civilian industrial firm as its engineering assistance contractor. The United States selected the General Motors Corp.; the FRG, the German Development Corp. Personnel from these contractors composed a joint design team.

Working closely together in this organizational frame, American and German experts have overcome linguistic and technical differences in reaching agreement on "one" tank as called for in the basic agreement. Not only has a mutually agreeable design been established but remaining development workloads have been defined and assigned to the nation responsible for execution.

The United States, for example, will furnish a new high horsepower multi-fueled engine; incorporate its Shillelagh missile system into a newly de-

Maj. Gen. B. I. Funk, Commander, Ballistic Systems Div., Air Force Systems Command, at Space & Ballistic Missile Technical Symposium, Air Force Academy, Colo., July 6-8; at British United Services meeting, Los Angeles, Calif., July 15.

Gen. B. A. Schriever, Commander, Air Force Systems Command, at Tennessee Space Institute, Arnold Air Force Station, Tenn., July 11.

Maj. Gen. J. J. Cody, Dep. Chief of Staff, Systems, Air Force Systems Command, at Society of American Military Engineers, Vandenberg AFB, Calif., July 19; at Photo-Optical Engineers Institute, St. Louis, Mo., Aug. 22.

Lt. Gen. W. A. Davis, Vice Commander, Air Force Systems Command, at Atlantic Research Conference, Costa Mesa, Calif., July 29.

Maj. Gen. H. J. Sands, Jr., Commander, Ballistics Systems Div., Air Force Systems Command, at Atlantic Research Conference, Costa Mesa, Calif., July 29.

Gen. H. M. Estes, Jr., Commander, Military Airlift Command, at National Defense Transportation Assn. meeting, Atlanta, Ga., Aug. 11.

Main Battle Tank Program Enters New Phase

signed Primary Armament System; and submit a new type suspension system for final selection by the Program Management Board.

The Federal Republic of Germany will furnish a uniquely designed transmission capable of handling the horsepower output promised by the American engine; will continue development of a more conventional high horsepower engine as a backup; and will submit a new type suspension system also for final selection by the Program Management Board.

Since the new Main Battle Tank for the 1970's will be expected to fight and survive on a nuclear battle field, many details concerning the project remain classified. But no single task now appears to be unsolvable with the result that progress of the US/FRG cooperative tank development program is forging ahead.

With its success, increased interest from other NATO nations is expected. The Program Management Board has briefed many friendly nations to date and expects the benefits of cooperative development will be shared by others beside the United States and Germany.

NOTES FOR EDITORS

Briefed below are some events and projects within the Department of Defense which may be of interest to writers and editors. If further information on any of these topics is desired, please write to Chief, Magazine and Book Branch, Office of Assistant Secretary of Defense (Public Affairs), Washington, D.C., 20301

NAVY STUDIES HOMING PIGEONS FOR HINTS ON NAVIGATION

Navy scientists are taking an increased interest in the uncanny ability of homing pigeons to find their way back to their nests over unfamiliar terrain.

Knowledge gained from experiments now being conducted with the birds could lead to new concepts in miniature navigation and detection systems.

To study the phenomenon, the Navy is tracking the birds with a miniature radio beacon transmitter strapped to the pigeon's back. In tracking the pigeon, two receiving stations are set up at different locations along the bird's probable flight path. When the instrumented bird is released, the two stations begin to record information on the bird's flight behavior.

The transmitter, which weighs less than two ounces including power supply, has an output of one thousandth of a watt.

It is hoped that investigations will provide information which will enable scientists to clarify various hypotheses concerning those factors affecting the homing instinct.

NAVY TESTS FLIGHT DECK COATING

The U.S. Navy is testing a new flight deck surfacing compound on its aircraft carriers called poly urethane. Tests show that the new product lasts three to four times longer than surfacing now in use. Because poly urethane bonds well with wood and steel, the Navy hopes to use the compound as a preservative of the wood on anti-submarine aircraft carrier flight decks. Crushed quartz sand added to the compound makes it an affective non-skid surface.

NEW OIL ANALYSIS SYSTEM NO LONGER REQUIRES LABORATORY FACILITIES

Engine oil analysis to detect aircraft engine wear is about to come out of the laboratory and move into the maintenance hangar. Using a small analyzer now under development, the Air Force will be able to detect the amount of submicroscopic metal particles in oil which indicate aircraft engine wear without the controlled laboratory conditions that are now necessary.

The technique of analyzing engine oil to measure wear is not new, but its application to gas turbine engines is comparatively recent. With the new analyzer, engine oil samples extracted periodically from engine oil systems are examined for metallic contamination by spectrometric analysis. In this technique, the oil specimen is vaporized by heat, and its light output separated by wave lengths. Spectral light then passes through exit slots positioned in the focal curve to obtain wave lengths of the various metals in the oil sample. Different metals show up in different colors in the spectrum.

NAVY ADOPTS NEW STEREOSCOPIC SYSTEM IN UNDERWATER EXPLORATION

Navy oceanographers are now using a cable-lowered information gathering stereoscopic system which includes twin cameras for taking stereo photos, a coring device, current velocities and direction recording instruments, sediment samplers, water samplers and a temperature profiler, in their studies of the sea.

Watertight cases enclose the cameras and power supply which, with the system instrumentation, are mounted in a skid-like frame. The complete unit weighs less than 500 pounds in sea water and is pressure resistant to depths of over 36,000 feet. Special tripping mechanisms and a preset programming device operate the cameras, strobe lights and other equipment in proper sequence. A sonar transducer mounted on the frame is used to position the system at any specified target height from the bottom.



To study the homing ability of pigeons, the Navy has developed a miniature transmitting system which is strapped to the bird's back during flight. The instrument records changes in the environment as well as the bird's physiological reactions. Attached as shown in the model, the tracking transmitter could be helpful in answering the question of how homing pigeons are able to navigate.

CALENDAR OF EVENTS

July 5-9: American College Public Relations Assn. Meeting, Boston, Mass.

July 11-15: National Conference of Weights & Measures, Denver, Colo.

July 16-19: National Audio-Visual Assn. Meeting, Washington, D.C.

July 19-23: National Tool, Die and Precision Machining Assn. Meeting, Hot Springs, Va.

Aug. 7-12: Professional Photographers of America Meeting, Chicago, Ill.

Aug. 8-11: Society of Automotive Engineers Meeting, Los Angeles, Calif.

Aug. 17-19: Joint Automatic Control Conference, Seattle, Wash.

Aug. 19-26: VFW National Convention, New York City.

Aug. 22-Sept. 10: Science Congress, Tokyo, Japan.

Aug. 26-Sept. 1: American Legion National Convention, Washington, D.C.

Sept. 11-16: American Chemical Society Meeting, New York City.

Sept. 18-21: American Institute of Chemical Engineers Meeting, Atlantic City, N.J.

Sept. 18-22: American Society for Industrial Security Meeting, Philadelphia, Pa.

Sept. 21: International Atomic Energy Agency Meeting, Vienna, Austria.

Sept. 27-30: American Roentgen Ray Society Meeting, San Francisco, Calif.

Oct. 3-5: Aerospace & Electronic Systems Convention, Washington, D.C.

Oct. 4-6: American Oil Chemists Society Meeting, Philadelphia, Pa.

Oct. 5-7: International Association of Electrical League, Scottsdale, Ariz.

Oct. 6: NSIA Maintenance Advisory and Procurement Advisory Committee Meetings, Washington, D.C.

Oct. 7: Society of American Military Engineers Meeting, St. Paul, Minn.

Oct. 9-12: National Defense Transportation Assn. Meeting, Dallas, Tex.

Oct. 9-14: Electrochemical Society Meeting, Philadelphia, Pa.

Oct. 10-12: Assn. of the U.S. Army Meeting, Washington, D.C.

Oct. 17-21: American Society of Civil Engineers Meeting, Philadelphia, Pa.

Oct. 18-20: American Society of Mechanical Engineers Meeting, Minneapolis, Minn.

Oct. 19-21: Institute of Electric & Electronic Engineers Meeting, Boston, Mass.

Oct. 26-29: Second International Congress on Air Technology, Hot Springs, Ark.

Oct. 31-Nov. 2: Defense Supply Assn. Meeting, Philadelphia, Pa.

USAF Selects Contractor To Develop Research Vehicle for Project PILOT

The U. S. Air Force has selected the Martin Co. to develop a manned, lifting body vehicle—a revolutionary rocket plane without wings—to explore the atmospheric maneuverability of future spacecraft.

The new research vehicle, designated the SV-5P, will be built for the Air Force Systems Command's Aeronautical Systems Division as part of the PILOT (Piloted Low Speed Test) Project.

Powered by a rocket engine, it will carry one man and be used to learn more about the flight characteristics and maneuverability of wingless lifting bodies from supersonic speeds of approximately mach 2 (more than 1,000 miles an hour) down to landing at normal jet-fighter speeds of between 120 and 150 miles an hour.

Initially, the SV-5P will be carried aloft under the wing of a B-52 aircraft and will be dropped for powerless, gliding flights landing at Edwards AFB, Calif. In later powered tests, the lifting body will be dropped

from the B-52 and then will rocket to Mach 2 speed at about 100,000 feet altitude from where it will maneuver to a landing at Edwards.

The SV-5 shape looks like a bulbous wedge, curving on the top, flat on the bottom with angled vertical fins. The aerodynamic shape of this research aircraft is the result of many hours of wind tunnel testing and aerodynamics analysis by Martin and the Air Force over the past seven years.

The PILOT Project is part of the Air Force's Spacecraft Technology and Advanced Reentry Test (START) Program. Also in the overall program is an unmanned version of the SV-5 which will be boosted to orbital altitude and hypersonic speed from where it will perform maneuvering reentry through the earth's atmosphere to a recovery initiation at approximately Mach 2.

Flight testing of the manned SV-5P will be conducted by a joint Air Force-NASA test team at Edwards AFB.

USAF Electronics Briefing for Industry Postponed

The Air Force has postponed the classified advanced planning briefing for industry on electronic systems which was scheduled to be held in Boston, Mass., June 28-30 (*Defense Industry Bulletin*, May 1966, page 10).

The briefing, sponsored by the Air Force Systems Command's Electronic Systems Division and the National Security Industrial Association, is now being planned for the fall on a date to be announced.

Postponement action was in accord with Air Force policy to assure full support for operations in Southeast Asia by canceling or postponing certain activities not absolutely essential and related to operational requirements.

Lift-Cruise Engine Contracts Awarded

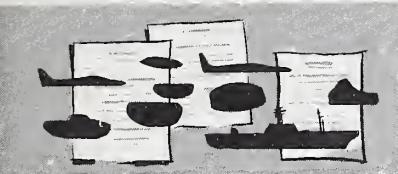
The U. S. Air Force has awarded contracts totaling \$41,750,000 to three engine manufacturers for development of a vectored-thrust cruise propulsion system (lift-cruise engine).

The three contractors are General Electric, Evendale, Ohio; Pratt & Whitney, East Hartford, Conn.; and the Wright Aeronautical Division, Curtiss-Wright Corp., Wood-Ridge, N. J. The companies will perform their work under contract to the Aero Propulsion Laboratory (APL) of the Air Force Systems Command's Research and Technology Division.

In Phase I of the program each company will build a lift-cruise engine to demonstrate engineering technology. In Phase II one or more contractors will be selected to build a lift-cruise engine to size and for a specific application. The Air Force expects the program to advance the engine thrust-to-weight ratio considerably. Present engines develop a thrust-to-weight ratio of about four to one.

The program is managed by Major E. A. Johnson of APL's Turbine Engine Division. Ralph L. Apel is the Air Force project engineer.

The lift-cruise engine developed under this program will be applicable to V/STOL and other aircraft systems. Contractors were given the go-ahead on the 15-month program Jan. 1, 1966.



DEFENSE PROCUREMENT

Contracts of \$1,000,000 and over awarded during the month of May 1966:

DEFENSE SUPPLY AGENCY

2—U.S. Bedding Co., St. Paul, Minn. \$1,933,680. 70,000 steel bunk beds and 150,000 adapters. St. Paul. Defense General Supply Center, Richmond, Va.

—Cesco Container Mfg. Corp., Northampton, Mass. \$1,128,416. 92,645 plywood locker trunks. Northampton. Defense Personnel Support Center, Philadelphia.

4—Oscar Mayer & Co., Madison, Wis. \$1,153,820. 499,968 cans of pre-fried sliced bacon. Madison. Defense Personnel Support Center, Philadelphia.

—Kayser Roth Corp., Colonial Div., Woodbury, Tenn. \$1,550,060. 807,744 men's blue chambray shirts. Woodbury. Defense Personnel Support Center, Philadelphia.

—Riegel Textile Corp., New York City. \$5,376,600. 8,461,251 yards of cotton sateen cloth. New York City. Defense Personnel Support Center, Philadelphia.

—B. G. Colton, New York City. \$1,615,925. 976,272 yards of cotton duck cloth. New York City. Defense Personnel Support Center, Philadelphia.

—Putnam Mills, New York City. \$2,206,616. 2,389,130 yards of cotton duck cloth. New York City. Defense Personnel Support Center, Philadelphia.

6—Dowling Bag Co., Valdosta, Ga. \$1,366,000. Six million sandbags. Defense General Supply Center, Richmond, Va.

—Cavalier Bag Co., Lumberton, N.C. \$1,675,804. Seven million sandbags. Defense General Supply Center, Richmond, Va.

9—Smith, Kline & French Laboratories, Philadelphia. \$1,129,167. 78,360 bottles of chlorpheniramine maleate, phenylpropanolamine hydrochloride and isopropamide iodine capsules. Defense Personnel Support Center, Philadelphia.

11—Pettibone Mulliken Corp., Washington, D.C. \$1,440,200. 76 diesel fork lift trucks. Defense General Supply Center, Richmond, Va.

—Oscar Mayer & Co., Madison, Wis. \$1,315,131. 3,570,816 five and one-half-ounce cans of sliced pork. Defense Personnel Support Center, Philadelphia.

—Oscar Mayer & Co., Madison, Wis. \$1,313,346. 3,570,816 five and one-half-ounce cans of sliced ham. Defense Personnel Support Center, Philadelphia.

12—West Point-Pepperell, Inc., New York City. \$1,219,045. 1,210,170 linear yards of cotton duck cloth. New York City. Defense Personnel Support Center, Philadelphia.

—Mt. Vernon Mills, Baltimore, Md. \$1,237,436. 1,233,130 linear yards of cotton duck cloth. Baltimore. Defense Personnel Support Center, Philadelphia.

—Prestex, Inc., New York City. \$1,936,781. 1,607,489 linear yards of cotton duck cloth. New York City. Defense Personnel Support Center, Philadelphia.

13—Burlington Industries, Pacific Mills Div., New York City. \$3,669,450. 1,439,000 linear yards of polyester fiber and wool tropical cloth. Defense Personnel Support Center, Philadelphia.

—The Defense Fuel Supply Center, Alexandria, Va., has awarded the following contracts for grade 115/145 aviation gas:

- Humble Oil & Refining Co., Houston, Tex. \$11,021,829. 77,335,000 gals.
- Socony Mobil Oil Co., New York City. \$10,881,413. 78,550,000 gals.
- Richfield Oil Corp., Los Angeles. \$9,896,369. 65,100,000 gals.

18—Etowah Industries, Etowah, Tenn. \$1,419,000. 300,000 men's wind resistant cotton coats. Etowah. Defense Personnel Support Center, Philadelphia.

—Kings Point Industries, Inc., New York City. \$1,048,000. 200,000 men's wind resistant cotton coats. New York City. Defense Personnel Support Center, Philadelphia.

19—Rachman Mfg. Co., Reading, Pa. \$3,944,950. 400,000 field type insect bars. Reading. Defense Personnel Support Center, Philadelphia.

—Regal Textile Corp., New York City. \$1,244,029. 1,460,000 yards of fire resistant cotton oxford cloth. New York City. Defense Personnel Support Center, Philadelphia.

20—Tucker Mfg. Co., Montgomery, Ala. \$1,699,428. 1,630,776 solid wood tent poles. Montgomery. Defense Personnel Support Center, Philadelphia.

—Land O'Lakes Creameries, Inc., Minneapolis, Minn. \$1,366,094. 2,739,312 pounds of dehydrated ice cream mix. Minneapolis. Defense Personnel Support Center, Philadelphia.

23—The Defense Fuel Supply Center, Alexandria, Va., has awarded the following contracts for petroleum:

- Texaco Export, Inc., New York City. \$9,984,000. 4,800,000 barrels, Navy Special.
- Richfield Oil Corp., Los Angeles. \$3,960,080. 300,000 barrels fuel oil.

Cities Service Oil Co., New York City. \$7,880,854. 58,800,000 gals.

Tidewater Oil Co., New York City. \$6,338,836. 46,032,000 gals.

Standard Oil Co. of Calif., San Francisco. \$5,846,127. 40,278,000 gals.

Standard Oil Co., Louisville, Ky. \$5,783,682. 43,034,926 gals.

American Oil Co., Chicago. \$4,691,432. 31,231,000 gals.

Phillips Petroleum Co., Bartlesville, Okla. \$4,521,001. 34,240,000 gals.

Sinclair Refining Co., New York City. \$3,333,960. 25,200,000 gals.

Continental Oil Co., Houston, Tex. \$2,034,033. 15,852,500 gals.

Union Oil Co. of Calif., Los Angeles. \$1,760,608. 11,508,000 gals.

Shamrock Oil & Gas Corp., Amarillo, Tex. \$1,391,003. 10,560,000 gals.

LaGloria Oil & Gas Co., Houston, Tex. \$1,198,751. 8,772,000 gals.

Tidewater Oil Co., Los Angeles. \$1,167,264. 7,560,000 gals.

16—Bruce Products, Inc., Eatontown, N.J. \$2,364,000. 200,000 men's lightweight taupe raincoats. Eatontown. Defense Personnel Support Center, Philadelphia.

—Laura Industries, Inc., Selma, Ala. \$1,253,745. 109,100 men's lightweight taupe raincoats. Selma. Defense Personnel Support Center, Philadelphia.

17—Rachelle Laboratories, Long Beach, Calif. \$1,330,094. 757,440 bottles (100 tablets each) of tetracycline hydrochloride. Long Beach. Defense Personnel Support Center, Philadelphia.

—Pacific Mills, division of Burlington Industries, New York City. \$1,800,000. 400,000 yards of wool serge cloth. New York City. Defense Personnel Support Center, Philadelphia.

—Hanora Fabrics Co., New York City. \$1,595,750. 350,000 yards of wool serge cloth. New York City. Defense Personnel Support Center, Philadelphia.

—J. P. Stevens & Co., New York City. \$3,516,000. 800,000 yards of wool serge cloth. New York City. Defense Personnel Support Center, Philadelphia.

—American Oil Co., Chicago. \$2,199,061. Fuel oil and gasoline. Chicago. Defense Fuel Supply Center, Alexandria, Va.

—Socony Mobil Oil Co., New York City. \$1,464,196. Fuel oil and gasoline. Defense Fuel Supply Center, Alexandria, Va.

—Texaco, Inc., New York City. \$1,131,725. Fuel oil and gasoline. New York City. Defense Fuel Supply Center, Alexandria, Va.

18—Etowah Industries, Etowah, Tenn. \$1,419,000. 300,000 men's wind resistant cotton coats. Etowah. Defense Personnel Support Center, Philadelphia.

—Kings Point Industries, Inc., New York City. \$1,048,000. 200,000 men's wind resistant cotton coats. New York City. Defense Personnel Support Center, Philadelphia.

19—Rachman Mfg. Co., Reading, Pa. \$3,944,950. 400,000 field type insect bars. Reading. Defense Personnel Support Center, Philadelphia.

—Regal Textile Corp., New York City. \$1,244,029. 1,460,000 yards of fire resistant cotton oxford cloth. New York City. Defense Personnel Support Center, Philadelphia.

20—Tucker Mfg. Co., Montgomery, Ala. \$1,699,428. 1,630,776 solid wood tent poles. Montgomery. Defense Personnel Support Center, Philadelphia.

—Land O'Lakes Creameries, Inc., Minneapolis, Minn. \$1,366,094. 2,739,312 pounds of dehydrated ice cream mix. Minneapolis. Defense Personnel Support Center, Philadelphia.

23—The Defense Fuel Supply Center, Alexandria, Va., has awarded the following contracts for petroleum:

- Texaco Export, Inc., New York City. \$9,984,000. 4,800,000 barrels, Navy Special.
- Richfield Oil Corp., Los Angeles. \$3,960,080. 300,000 barrels fuel oil.

Asiatic Petroleum Corp., New York City. \$2,728,000. 1,600,000 barrels, Navy Special.

Union Oil Co. of Calif., San Francisco. \$1,979,800. 100,000 barrels gasoline, combat Type 1; 600,000 barrels Navy Special.

Union Oil Co. of Calif., Los Angeles. \$2,088,100. 100,000 barrels fuel oil, diesel marine; 644,000 barrels Navy Special; 100,000 barrels No. 6 fuel oil.

Continental Oil Co., Houston, Tex. \$1,644,500. 460,000 barrels fuel oil, diesel marine.

Socony Mobil Oil, New York City. \$1,023,120. 368,000 barrels Navy Special; 100,000 barrels No. 6 fuel oil.

—H. I. Garment, Chicago. \$1,117,756. 112,112 wet-weather, coated nylon overalls. Chicago. Defense Personnel Support Center, Philadelphia.

—Addison Shoe Corp., Wynne, Ark. \$1,737,998. 167,133 mildeew resistant safety shoes. Wynne. Defense Personnel Support Center, Philadelphia.

24—Choctaw Mfg. Co., Silas, Ala. \$1,291,436. 524,976 men's white trousers. Silas. Defense Personnel Support Center, Philadelphia.

25—Prestex, Inc., New York City. \$3,363,236. 4,200,000 yards of cotton oxford cloth. New York City. Defense Personnel Support Center, Philadelphia.

—Riegel Textile Corp., New York City. \$1,209,946. 1,491,000 yards of cotton oxford cloth. New York City. Defense Personnel Support Center, Philadelphia.

—Glen Berry Mfg., Inc., Commerce, Okla. \$1,814,777. 1,195,000 cotton sateen trousers. Commerce. Defense Personnel Support Center, Philadelphia.

—Orthopedic Equipment Co., Bourbon, Ind. \$2,076,783. 98,286 folding litters. \$2,334,723. 225,816 tent poles. Bourbon. Defense Personnel Support Center, Philadelphia.

26—Alpha Industries, Knoxville, Tenn. \$1,503,920. 170,900 men's cotton sateen jackets. Knoxville. Defense Personnel Support Center, Philadelphia.

—Magline, Inc., Pinconning, Mich. \$2,146,823. 5,146 tent frame sections. Pinconning. Defense Personnel Support Center, Philadelphia.

—B. F. Goodrich, Watertown, Mass. \$1,001,322. 52,980 pairs of black cold-weather insulated boots. Watertown. Defense Personnel Support Center, Philadelphia.

—Edgington Oil Refineries, Long Beach, Calif. \$1,185,800. 484,000 barrels of fuel oil. Defense Fuel Supply Center, Alexandria, Va.

27—Warren Co., Atlanta, Ga. \$1,039,360. 1,624,600 cubic feet, refrigerators. Atlanta. Defense General Supply Center, Richmond, Va.

—Medart Products, Inc., St. Louis. \$1,589,333. 118,721 steel clothing lockers. St. Louis. Defense General Supply Center, Richmond, Va.

31—U.S. Steel Corp., Washington, D.C. \$1,141,346. 11,904,431 pounds of zinc coated, corrugated steel sheets. Washington, D.C. Defense Industrial Supply Center, Philadelphia.

—The following six contracts for petroleum products have been awarded by the Defense Fuel Supply Center, Alexandria, Va.:

- Hess Oil & Chemical Corp., Perth Amboy, N.J. \$1,076,250. 300,000 barrels diesel marine fuel oil.
- American Oil Co., Chicago. \$4,192,831. 850,000 barrels of gasoline.
- Shell Oil, New York City. \$3,665,220. 780,000 barrels of combat gas, Type I.
- Cities Service Oil Co., New York City. \$1,550,522. 16,800,000 gallons of JP-4 jet fuel.
- Sun Oil Co., Philadelphia. \$2,292,600. 600,000 barrels of diesel fuel oil.
- Hess Oil & Chemical Corp., Perth Amboy, N.J. \$1,577,625. 350,000 barrels of diesel fuel oil and 50,000 barrels of kerosene.

Contract Legend

Contract information is listed in the following sequence: Date—Company—Value—Material or Work to be Performed—Location Work Performed—Contracting Agency.

ARMY

2—**G.E.O. Systems**, Melbourne, Fla. \$1,148,694. Work on the Solar Vacuum Telescope. Sun Spot, N.M. Engineer Dist., Albuquerque, N.M.

—**Dorr-Oliver, Inc.**, Bartow, Fla. \$1,169,851. Gates and locks for the Arkansas River Navigation Project, Tampa, Fla. Engineer Dist., Little Rock, Ark.

—**Blount Construction Co.**, Montgomery, Ala. \$3,237,611. Work on the Columbia Lock and Dam, Caldwell County, La. Engineer Dist., Vicksburg, Miss.

—**Eugene Luhn & Co.**, Columbia, Ill. \$1,304,913. Work on the Village of New Athens, Kaskaskia River, Illinois Project. New Athens, Ill. Engineer Dist., St. Louis.

—**Cabot Corp.**, Pampa, Tex. \$1,059,265. 90mm gun tube forgings. Kingsmill, Tex. Watervliet Arsenal, N.Y.

—**United Aircraft**, Stratford, Conn. \$7,010,000. CH-54 helicopters. Stratford, Army Aviation Materiel Command, St. Louis.

—**University of Wisconsin**, Madison, Wis. \$1,260,000. Operation of the Mathematics Research Center at the University of Wisconsin. Army Research Office, Durham, N.C.

—**United Aircraft**, Pratt & Whitney Div., East Hartford, Conn. \$6,936,105. CH-54 aircraft engines. East Hartford, Army Aviation Materiel Command, St. Louis.

—**Chaney & Hope, Inc.**, Addison, Tex. \$1,048,400. Construction of nitric acid processing units. Kingsport, Tenn. Engineer Dist., Mobile, Ala.

—**Albion Malleable Iron Co.**, Albion, Mich. \$1,251,162. Heads and metal parts for the 2.75" rocket. Albion, Ammunition Procurement & Supply Agency, Joliet, Ill.

3—**Southwest Factories, Inc.**, Eidel International Div., Albuquerque, N.M. \$4,724,428. Mobile laundry units. Albuquerque, Army Mobility Equipment Center, St. Louis.

—**Lockley Machine Co.**, New Castle, Pa. \$3,681,848. Demolition kits and spare parts. New Castle. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Air Research Mfg. Co.**, Phoenix, Ariz. \$4,999,738. Gas turbine engines and utility sets. Phoenix, Army Medical Research & Development Command, Office of the Surgeon General, Washington, D.C.

—**AVCO Corp.**, Stratford, Conn. \$2,000,000. Modification of the T55-L-7 turbine engine. Stratford, Army Aviation Materiel Command, St. Louis.

4—**Olin-Mathieson Chemical Corp.**, East Alton, Ill. \$4,412,698. 7.62mm ammunition. East Alton, Frankford Arsenal, Philadelphia.

—**Remington Arms Co.**, Bridgeport, Conn. \$4,146,760. 7.62mm ammunition. Bridgeport, Frankford Arsenal, Philadelphia.

—**Arundel Corp.**, Baltimore, Md. \$1,962,874. Dredging in the Delaware River. New Castle County, Del. Engineer Dist., Philadelphia.

—**Bendix Corp.**, Baltimore, Md. \$9,386,664. Fuzes. Towson, Md. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Harvey Aluminum, Inc.**, Torrance, Calif. \$1,554,168. 40mm ammunition cases. Torrance, Ammunition Procurement & Supply Agency, Joliet, Ill.

—**R. G. LeTourneau, Inc.**, Longview, Tex. \$5,125,420. 750-pound bombs. Longview, Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Raytheon Co.**, Lexington, Mass. \$7,582,080. Metal parts for 750-pound bombs. Bristol, Ten. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Eureka Williams Co.**, Bloomington, Ill. \$1,510,620. Bomb fuzes. Bloomington, Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Bendix Corp.**, Baltimore, Md. \$4,500,720. Bomb fuzes. Baltimore. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Bell Helicopter Co.**, Fort Worth, Tex. \$1,209,496. Hub assemblies for HU-1 helicopters. Fort Worth, Army Aviation Materiel Command, St. Louis.

—**American Machine & Foundry Co.**, Brooklyn, N.Y. \$5,127,106. 750-pound bombs. Brooklyn, Ammunition Procurement & Supply Agency, Joliet, Ill.

5—**Chamberlain Corp.**, Waterloo, Iowa. \$3,115,000. Rehabilitation of the Army Ammunition Plant, Scranton, Pa. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**U.S. Time Corp.**, Waterbury, Conn. \$3,526,631. Tooling and special test equipment for artillery fuze production. Water-

bury. Ammunition Procurement & Supply Agency, Joliet, Ill.

6—**Rexar, Inc.**, West Alexandria, Ohio. \$1,109,151. Acetylene generating and charging plants, trailer mounted. West Alexandria, Army Mobility Equipment Center, St. Louis.

—**R. G. LeTourneau, Inc.**, Longview, Tex. \$1,075,000. 750-pound bomb assemblies. Longview. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Honeywell, Inc.**, Hopkins, Minn. \$2,450,000. Bomb fuzes and metal parts. New Brighton, Minn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Norris Thermador Corp.**, Hesse-Eastern Div., Everett, Mass. \$1,437,653. Bomb unit tube assemblies. Everett, Ammunition Procurement & Supply Agency, Joliet, Ill.

—**A. O. Smith Corp.**, Chicago. \$5,393,760. 750-pound bomb metal parts. Waco, Tex. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Bulova Watch Co.**, Jackson Heights, N.Y. \$4,150,002. Arming mechanisms for 81mm mortar shells. Jackson Heights. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Lane Construction Corp.**, Meriden, Conn. \$8,103,378. Construction on the Blanchard River Project. Blanchard, Pa. Engineer Dist., Baltimore, Md.

—**AVCO Corp.**, Richmond, Ind. \$1,120,545. Metal parts for 750-pound bombs. Richmond, Ammunition Procurement & Supply Agency, Joliet, Ill.

—**AVCO Corp.**, Richmond, Ind. \$1,182,968. Metal parts for 750-pound bombs. Richmond, Ammunition Procurement & Supply Agency, Joliet, Ill.

—**General Motors**, Allison Div., Indianapolis, \$3,176,105. Transmissions and power transfer units. Indianapolis. Army Tank Automotive Center, Warren, Mich.

—**AVCO Corp.**, Richmond, Ind. \$1,598,021. 2.75-inch rocket fuzes. Richmond. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**L. T. Industries, Inc.**, Garland, Tex. \$2,057,591. Fin assemblies for 750-pound bombs. Garland. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Raytheon Co.**, Lexington, Mass. \$1,629,417. Metal parts for bombs. Bristol, Tenn. Ammunition Procurement & Supply Agency, Joliet, Ill.

9—**Olin Mathieson Chemical Corp.**, New York City. \$4,244,724. Various propellant charges and miscellaneous ammunition. Charlestown, Ind. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Pettibone-Mulliken Corp.**, Chicago. \$4,335,560. Rough terrain truck fork lifts. Chicago, Army Mobility Equipment Center, St. Louis.

—**White Motor Co.**, Lansing, Mich. \$10,003,237. 2 1/2-ton trucks. Lansing. Army Mobility Command, Warren, Mich.

—**LTV Aerospace Corp.**, Warren, Mich. \$10,709,569. Advanced production engineering for the LANCE missile system. Warren, Army Missile Command, Huntsville, Ala.

—**U.S. Time Corp.**, Waterbury, Conn. \$21,547,830. Artillery shell fuzes. Waterbury; Euclid, Ohio; Bristol, Conn.; Patterson, N.J.; and Thomaston, Conn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Crichton, Ernst and Wallace**, Nashville, Tenn. \$9,526,000. Rehabilitation of existing TNT production lines. Chattanooga, Tenn. Army Mobile Engineer Dist., Mobile, Ala.

10—**Metz Construction Co.**, Tucson, Ariz. \$1,053,403. Construction of troop housing facilities and tactical equipment shops. Donna Ana Range, N.M. Engineer Dist., Albuquerque, N.M.

—**Grosshans & Petersen, Inc.**, Marysville, Kan. \$1,153,905. Relocation of Northern Pacific railroad track. Bismarck, N.D. Engineer Dist., Omaha, Neb.

—**General Electric**, Schenectady, N.Y. \$9,058,181. Multi-functional array radar power plant. Baltimore, Md. Engineer Dist., Honolulu, Hawaii.

—**Union Carbide Corp.**, New York City. \$5,579,127. Radio batteries. Chemway, N.C. and Red Oak, Iowa. Army Electronics Command, Philadelphia.

—**Marathon Battery Co.**, Wausau, Wis. \$1,447,688. Radio batteries. Wausau, Army Electronics Command, Philadelphia.

—**Burgess Battery Co.**, Freeport, Ill. \$1,416,780. Radio batteries. Freeport, Army Electronics Command, Philadelphia.

11—**B. Jahn Mfg. Co.**, New Britain, Conn. \$1,079,096. Cal. 30 carbine magazine assemblies. New Britain. Springfield Armory, Mass.

—**Bowen-McLaughlin-Hork Corp.**, York, Pa. \$1,481,469. Half-ton trucks. York. Army Tank Automotive Center, Warren, Mich.

—**Ford Motors**, Dearborn, Mich. \$1,247,807. Stake and platform trucks. Milpitas, Calif. and Claycomo, Mo. Army Tank Automotive Center, Warren, Mich.

—**Vinnel Corp.**, Alhambra, Calif. \$2,275,000. Overhaul and reft of tankers. Beaumont, Tex. Army Mobility Equipment Center, St. Louis.

12—**Boeing Co.**, Vertol Div., Morton, Pa. \$2,795,491. Rotary wing assembly for the CH-47 aircraft. Morton. Army Aviation Materiel Command, St. Louis.

—**Boeing Co.**, Vertol Div., Morton, Pa. \$1,089,200. Transmission assembly for CH-47 aircraft. Morton. Army Aviation Materiel Command, St. Louis.

—**Boeing Co.**, Vertol Div., Morton, Pa. \$1,129,789. Transmission for CH-47 aircraft. Morton. Army Aviation Materiel Command, St. Louis.

—**Leedcraft, Inc.**, Denton, Tex. \$2,956,460. Semi-trailers. Brady, Tex. Army Tank Automotive Center, Warren, Mich.

—**Bulova Watch Co.**, Jackson Heights, N.Y. \$1,784,708. Rocket fuzes. Jackson Heights. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Chrysler Motors**, Detroit. \$1,772,394. Cargo trucks. Warren, Mich. Army Tank Automotive Center, Warren, Mich.

13—**Fontaine Truck Equipment Co.**, Birmingham, Ala. \$1,793,268. Semi-trailers. Haleville, Ala. Army Tank Automotive Center, Warren, Mich.

—**Norris Thermador Corp.**, Los Angeles. \$1,940,400. 81mm projectiles. Los Angeles. Southwest Procurement Agency, Pasadena, Calif.

—**Parsons Mfg. and Stamping Co.**, Cardova, Tenn. \$1,611,617. Rotating disks. Cardova. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**American Fabricating Products Co.**, Indianapolis, Ind. \$1,593,589. Cartridge containers. Indianapolis. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**General Electric**, Burlington, Vt. \$1,204,473. Spare parts for aircraft guns, gun pods and armament pod sets. Burlington. Army Weapons Command, Rock Island, Ill.

—**Sanders Associates**, Bedford, Mass. \$2,983,564. Forward Area Acquisition Radar. Nashua, N.H.; Plainville, N.Y.; and Bedford. Army Missile Command, Huntsville, Ala.

—**Remington Arms Co.**, Bridgeport, Conn. \$10,205,407. Various types of ammunition. Independence, Mo. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**International Harvester Co.**, Chicago. \$1,851,423. Trucks. Bridgeport, Conn. Army Tank Automotive Center, Warren, Mich.

16—**Continental Motors**, Muskegon, Mich. \$2,500,000. 54,683 (1/2 horsepower, and 3 and 6 horsepower) engines. Muskegon. Army Mobility Equipment Center, St. Louis.

—**Colt's Inc.**, Hartford, Conn. \$1,160,264. Repair parts for operational support of the M16 and XM16E1 rifle. Hartford. Army Weapons Command, Rock Island Arsenal, Ill.

—**Peter Kiewit Sons Co.**, Vancouver, Wash. \$1,177,166. Work on the Granite Lock and Dam, Snake River, Washington Project. Garfield County, Wash. Engineer Dist., Walla Walla, Wash.

—**Honeywell, Inc.**, Hopkins, Minn. \$3,142,732. Bomb components. New Brighton, Minn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Amron Corp.**, Waukesha, Wis. \$3,130,135. Bomb components. Waukesha. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Aerojet General Corp.**, Downey, Calif. \$2,025,000. 2.75 inch rockets. Downey. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Hayes International Corp.**, Birmingham, Ala. \$1,323,000. Metal parts for 2.75 inch rockets. Birmingham. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**FMC Corp.**, Santa Clara, Calif. \$9,220,000. Metal parts for 4.2 inch projectiles. Santa Clara. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**RCA**, Camden, N.J. \$2,347,146. Radio sets and repair parts. Camden. Army Electronics Command, Philadelphia.

—**Allis Chalmers Mfg. Co.**, Milwaukee, Wis. \$2,665,948. Generators. Harvey, Ill. Army Mobility Equipment Center, St. Louis.

17—**Westclox**, division of General Time Corp., La Salle, Ill. \$4,574,520. Fuses for artillery ammunition. La Salle. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Ingraham Co.**, Bristol, Conn. \$4,612,350. Fuzes for artillery ammunition. Bristol. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**General Motors**, Detroit. \$5,048,100. Body and bomb assemblies for 81mm mortar projectiles. Warren, Mich. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**General Time Corp.**, Stamford, Conn. \$4,746,210. Artillery fuzes. Thomaston, Conn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Chamberlain Corp.**, Waterloo, Iowa. \$1,986,207. Bomb and body assemblies for the 81mm mortar projectile. Burlington, N.J. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**American Fabricated Products Co.**, Indianapolis, Ind. \$1,764,560. Fin assemblies for the 81mm mortar. Indianapolis. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Mead-Mount Construction Co.**, Denver, Colo. \$7,285,870. Construction of an academic building at the Air Force Academy, Colorado Springs, Colo. Engineer Dist., Omaha, Neb.

—**U.S. Rubber Co.**, Mishawaka, Ind. \$1,221,966. 513 sets of collapsible tank assemblies. Mishawaka. Army Mobility Equipment Center, St. Louis.

—**Allis Chalmers Mfg. Co.**, Milwaukee, Wis. \$2,402,013. 43 tractors with bulldozers. Springfield, Ill. Army Mobility Equipment Center, St. Louis.

—**J.H. Pomeroy Co. and M-B Contracting Co.**, San Francisco. \$12,600,000. Paving construction of POL and support facilities at Kadena Air Base, Okinawa. Engineer Dist., Ryukyu Islands.

—**Aerojet-General Corp.**, Downey, Calif. \$1,913,960. Ordnance items. Downey. Edgewood Arsenal, Md.

18—**DeLong Corp.**, New York City. \$14,707,-741. 14 type A piers (300' by 80') and 13 type B piers (150' by 60'). Japan and Vietnam. Army Mobility Equipment Center, St. Louis.

—**International Harvester Co.**, Melrose Park, Ill. \$1,058,766. 45 low-speed, full tracked tractors. Chicago. Army Mobility Equipment Center, St. Louis.

—**Mason & Hanger Silas Mason & Co.**, Lexington, Ky. \$5,687,600. Loading, assembling and packing of 500 and 750 lb. bombs. Grand Island, Neb. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**AVCO Corp.**, Stratford, Conn. \$2,205,700. 966 turbine rotors for UH-1 aircraft. Stratford. Army Aviation Materiel Command, St. Louis.

—**Boeing Co.**, Morton, Pa. \$5,900,000. Pre-production planning, procurement and production of long lead time materials and items for CH-47 helicopters. Morton. Army Aviation Materiel Command, St. Louis.

—**Zenith Radio Corp.**, Chicago. \$3,145,350. Bomb fuzes. Chicago. Picatinny Arsenal, Dover, N.J.

—**General Electric**, Burlington, Vt. \$8,349,-311. 20mm guns and pods for F-4C aircraft. Burlington. Army Weapons Command, Rock Island, Ill.

—**Patton-Tully Transportation Co.**, Memphis, Tenn. \$1,289,685. Work on the Mississippi River and Tributaries Channel improvement project. Hughes, Ark. and Robbinsville, Miss. Engineer Dist., Memphis, Tenn.

—**T. L. James & Co., Inc.**, Ruston, La. \$1,123,739. Work on the Mississippi River and Tributaries project. Memphis and Dyersburg, Tenn. Engineer Dist., Memphis, Tenn.

19—**Raytheon Co.**, Lexington, Mass. \$1,666,516. Design and development of the Hawk missile system. Lexington. Army Missile Command, Huntsville, Ala.

—**Chrysler Corp.**, Detroit. \$14,124,863. M60-A1E1 turret systems and repair parts. Warren, Mich. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Hamilton Watch Co.**, Lancaster, Pa. \$8,-215,130. Fuzes for artillery projectiles. Lancaster. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Harvey Aluminum, Inc.**, Torrance, Calif. \$2,620,825. 20mm projectiles. Torrance. Frankford Arsenal, Philadelphia.

—**United Aircraft**, Windsor Locks, Conn. \$2,895,576. Fuel controls for the T-55 engine. Windsor Locks. Army Aviation Materiel Command, St. Louis.

20—**Sylvania Electric Products Co.**, Mountain View, Calif. \$5,500,000. Classified electronics equipment. Mountain View. Army Electronics Command, Fort Monmouth, N.J.

—**International Harvester Co.**, Melrose Park, Ill. \$5,181,484. 563 four-wheel drive, scoop type loaders. Libertyville, Ill. Army Mobility Equipment Center, St. Louis.

—**Boeing Co.**, Morton, Pa. \$62,120,000. CH-47A helicopters. Morton. Army Aviation Materiel Command, St. Louis.

—**IBM**, Bethesda, Md. \$2,053,036. Design, fabrication, test, delivery, installation and checkout of a complete telemetry data center. White Sands Missile Range, N.M.

—**Poor & Co.**, Minneapolis, Minn. \$1,442,-400. Eight rock crushing and screening plants. Minneapolis. Army Mobility Equipment Center, St. Louis.

—**Eagle Crusher Co.**, Galion, Ohio. \$1,526,650. 23 rock crushing and screening plants. Galion. Army Mobility Equipment Center, St. Louis.

—**General Electric**, Burlington, Vt. \$3,326,-999. 504 aircraft machine guns and 100 pods; for two lots each of repair parts and ancillary equipment. Burlington. Army Weapons Command, Rock Island, Ill.

—**AVCO Corp.**, Stratford, Conn. \$1,425,000. Facilities to increase production capacity of T-55 engines. Stratford. Army Aviation Materiel Command, St. Louis.

—**Republic Steel Corp.**, Youngstown, Ohio. \$1,336,000. 3,200,000 square feet of metal ground mats for outdoor storage. Youngstown. Army Mobility Equipment Center, St. Louis.

—**Colt's Inc.**, Hartford, Conn. \$5,750,000. 5.56mm rifles. Hartford. Army Weapons Command, Rock Island, Ill.

—**Blount Bros. Corp.**, Montgomery, Ala. \$6,900,000. Rehabilitation of about 500 enlisted men buildings and construction of about 137,000 square feet of new facilities for U.S. Army Training Center, Fort Campbell, Ky. Engineer Dist., Louisville, Ky.

22—**AVCO Corp.**, Stratford, Conn. \$2,830,000. T53-L-7 aircraft engines for the OV-1 helicopter. Stratford. Army Aviation Materiel Command, St. Louis.

—**McDonnell Aircraft**, St. Louis. \$1,470,000. Engineering development for the Medium Anti-tank/assault Weapon. St. Louis. Army Missile Command, Huntsville, Ala.

—**Harvey Aluminum, Inc.**, Torrance, Calif. \$3,263,412. 40mm cartridge cases. Torrance. Ammunition Procurement & Supply Agency, Joliet, Ill.

24—**Bulova Watch Co.**, Jackson Heights, N.Y. \$4,897,080. Fuzes for artillery ammunition. Jackson Heights. Ammunition Procurement & Supply Agency, Joliet, Ill.

25—**Associated Spring Corp.**, Plymouth, Mich. \$1,658,185. 5,800,000 metallic belts for 20mm cartridges. Plymouth. Frankford Arsenal, Philadelphia.

—**Federal Cartridge Corp.**, Anoka, Minn. \$1,428,077. Bandoleer-packed 5.56mm ball cartridges. Anoka. Frankford Arsenal, Philadelphia.

—**Massman Construction Co. and Eugene Luhr & Co.**, Kansas City, Mo. \$1,233,292. Work on the Mississippi River and Tributaries Channel Improvement Project. Caruthersville, Mo. and Dyersburg, Tenn. Engineer Dist., Memphis, Tenn.

—**General American Transportation Corp.**, Chicago. \$4,125,000. Railway tank cars. Chicago. Army Mobility Equipment Center, St. Louis.

—**Holston Defense Corp.**, Kingsport, Tenn. \$8,700,770. Explosives and for operation and maintenance activities at Holston Army Ammunition Plant, Kingsport, Tenn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**General Motors**, Detroit. \$1,325,947. 1,162 engine assemblies with containers, and for 894 transmission assemblies with containers. Flint, Mich. Army Tank Automotive Center, Warren, Mich.

—**Zero Mfg. Co.**, Silver Spring, Md. \$1,145,-400. 46 expandable shelters for self-contained, transportable medical units. Burbank, Calif. Army Medical Research & Development Command, Washington, D.C.

—**Matanuska Maid, Inc.**, Anchorage, Alaska. \$2,011,174. Dairy products. Anchorage. Purchasing & Contracting Office, Fort Richardson, Alaska.

—**Progressive Construction Co.**, Farmersville, Va. \$1,417,000. Construction and rehabilitation of Army Training Center buildings and support facilities at Fort Bragg, N.C. Engineer Dist., Savannah, Ga.

26—**FMC Corp.**, San Jose, Calif. \$2,003,704. Canister assemblies. San Jose. Picatinny Arsenal, Dover, N.J.

—**FMC Corp.**, San Jose, Calif. \$1,443,770. Rubber tire wheels for the M113 armored personnel carrier. Charleston, W. Va. Army Tank Automotive Center, Warren, Mich.

—**Whirlpool Corp.**, Evansville, Ind. \$2,696,-737. Canister assemblies. Evansville. Picatinny Arsenal, Dover, N.J.

—**Collins Radio Co.**, Richardson, Tex. \$10,-000,000. 2,650 air-to-ground communications radio sets (AN/ARC-54). Richardson. Army Electronics Command, Fort Monmouth, N.J.

—**Varo, Inc.**, Garland, Tex. \$3,000,000. Image intensifier assemblies, 25mm, used with STARLIGHT scope and crew served weapon sight. Garland. Army Electronics Command, Fort Monmouth, N.J.

—**International Telephone & Telegraph Corp.**, Easton, Pa. \$4,000,000. Image intensifier assemblies. Roanoke, Va. Army Electronics Command, Fort Monmouth, N.J.

27—**Hercules, Inc.**, Wilmington, Del. \$2,965,-241. Miscellaneous propellants and explosives. Radford, Va. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Robert L. Guyer**, Lamposa, Tex. \$1,244,-363. Data processing conversion and logistical facility depot conversion. Kelly AFB, Tex. Engineer Dist., Fort Worth, Tex.

—**Pine Bluff Gravel Co.**, Pine Bluff, Ark. \$1,180,248. Work on the Mississippi River and Tributaries (Flood Control) Channel Improvement Project. Washington County, Miss., and Chicot County, Ark. Engineer Dist., Vicksburg, Miss.

—**American Electronics Laboratory Inc.**, Lansdale, Pa. \$3,099,651. Countermeasure sets. Colmar, Pa. Army Electronics Command, Philadelphia.

—**General Motors**, Indianapolis, Ind. \$2,059,-037. T-63-A-5A aircraft engines for the OH-6A aircraft. Indianapolis. Army Aviation Materiel Command, St. Louis.

—**Maremont Corp.**, Saco, Maine. \$5,321,074. M-60 and M-60D machine guns with barrels and bi-pod assemblies. Saco. Army Weapons Command, Rock Island, Ill.

—**Philco Corp.**, Philadelphia. \$22,686,674. Engineering assistance and installation of an integrated wire-band communication system in Southeast Asia. Army Electronics Command, Fort Monmouth, N.J.

—**Northern Metals Co.**, Philadelphia. \$6,194,-333. Stevedoring, terminal handling and vehicle processing services. North Philadelphia. Military Traffic Management and Terminal Service, Brooklyn, N.Y.

—**AVCO Corp.**, Stratford, Conn. \$30,064,554. T-53-L-11 and T-53-L-13 engines for UH-1 aircraft. \$10,983,974. T-55-L-7 engines for CH-47 aircraft. Stratford. Army Aviation Materiel Command, St. Louis.

—**AVCO Corp.**, Stratford, Conn. \$1,082,000. 2.75-inch rocket fuzes. Richmond, Va. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**KDI Corp.**, Cincinnati, Ohio. \$1,126,144. Fuzes for 2.75-inch rockets. Cincinnati. Ammunition Procurement & Supply Agency, Joliet, Ill.

31—**Raytheon Co.**, Lexington, Mass., has been awarded the following five contracts from the Army Missile Command, Huntsville, Ala.:

- \$1,268,383. Engineering model of Reliability Monitoring Equipment for the HAWK missile. Bedford, Mass.
- \$1,410,960. Magnetro tubes for the NIKE HERCULES missile system. Waltham, Mass.
- \$1,720,797. Engineering services for the self-propelled HAWK missile system. Andover, Mass.
- \$3,488,000. Retrofit kits for the HAWK missile system. Andover, Mass.
- \$4,768,000. Retrofit kits for the HAWK missile system. Andover, Mass.

—**Federal Laboratories**, Saltsburg, Pa. \$1,-675,938. Chemicals. Edgewood Arsenal, Md.

—**Consolidated Diesel Electric Co.**, division of Condec Corp., Stamford, Conn. \$2,728,-527. 217 ten-ton tractor truck bodies (less engines, transmissions and axles). Schenectady, N.Y. Army Tank Automotive Center, Warren, Mich.

—General Motors, Indianapolis, Ind. \$1,815,-823. Four 1,500 horsepower trains. Indianapolis. Army Tank Automotive Center, Warren, Mich.

—Kentucky Mfg. Co., Louisville, Ky. \$1,-127,670. 500 twelve-ton stake semi-trailers. Louisville. Army Tank Automotive Center, Warren, Mich.

—Kaiser Jeep Corp., Toledo, Ohio. \$4,270,-458. 3,500 GVW utility trucks. Toledo. Army Tank Automotive Center, Warren, Mich.

—Chrysler Corp., Center Line, Mich. \$6,-764,173. Production and inspection engineering services for the M60A tank, M60A1E1 tank, M728 combat engineer vehicle, M60A1 Italian co-production program and for project modification kits. Center Line. Army Tank Automotive Center, Warren, Mich.

—Dorsey Trailer, Inc., Elba, Ala. \$1,414,501. 191 twelve-ton semi-trailer vans. Elba. Army Tank Automotive Center, Warren, Mich.

—Fruehauf Corp., Detroit. \$2,862,604. 5,000-gallon fuel servicing semi-trailers. Uniontown, Pa. Army Tank Automotive Center, Warren, Mich.

—Mack Truck, Inc., Allentown, Pa. \$1,300,-035. Axles for 10-ton military tractor trucks. Allentown. Army Tank Automotive Center, Warren, Mich.

—Dorsey Trailer, Inc., Elba, Ala. \$1,789,630. 852 twelve-ton stake semi-trailers. Elba. Army Tank Automotive Center, Warren, Mich.

—AVCO Corp., Cincinnati, Ohio. \$1,359,300. AS-1729/VRC fixed-based, vehicle mounted antennae. Cincinnati. Army Electronics Command, Philadelphia.

—Varo, Inc., Garland, Tex. \$1,890,698. 650 searchlight sets for use on jeeps, M48 tanks and helicopters. Garland. Army Electronics Command, Fort Monmouth, N.J.

—Collins Radio Co., Cedar Rapids, Iowa. \$3,884,904. Radio receiving sets (AN/ARN-82). Cedar Rapids. Army Electronics Command, Fort Monmouth, N.J.

—General Electric, Burlington, Vt. \$4,777,-000. XM163 weapons system, repair parts and documentation for self-propelled artillery air defense gun mounted on M113 personnel carriers. Burlington. Army Weapons Command, Rock Island, Ill.

—Philco Corp., Newport Beach, Calif. \$2,-685,375. Guidance and control sets, and transmitter alignment test sets for the SHILLELAGH missile system. Newport Beach. Army Missile Command, Huntsville, Ala.

—Philco Corp., Newport Beach, Calif. \$6,-415,707. Tooling costs and initial production of CHAPARRAL air defense missile fire units. Newport Beach. Army Missile Command, Huntsville, Ala.

—Cessna Aircraft Co., Wichita, Kan. \$1,-186,595. Dispensers (SUU-13/A) for the Air Force. Wichita. Ammunition Procurement & Supply Agency, Joliet, Ill.

—Remington Arms Co., Bridgeport, Conn. \$1,195,800. Carton-packed 5.56mm cartridge tracers. Bridgeport. Frankford Arsenal, Philadelphia.

—Eureka Williams Co., Bloomington, Ill. \$4,719,264. Fuze for hand grenades. Bloomington. Ammunition Procurement & Supply Agency, Joliet, Ill.

—Hanson Machinery Co., Tiffin, Ohio. \$2,-320,789. 66 five-ton capacity, diesel engine driven cranes. Tiffin. Army Mobility Equipment Center, St. Louis.

—Institute for Defense Analyses, Arlington, Va. \$1,165,000. A two months extension of effort for continued research on economic, technical, political and military studies. Arlington. Defense Supply Services, Washington, D.C.

—Global Associates, Oakland, Calif. \$5,161,299. Logistic support at Kwajalein Test Site. NIKE X Project Office, Huntsville, Ala.

—Boeing Co., Morton, Pa. \$2,432,752. Acquisition and use of Government facilities to increase CH-47A aircraft production. Morton. Army Aviation Materiel Command, St. Louis.

—Aerojet General Corp., Downey, Calif. \$2,-223,311. Dispensers (SUU-14/A) and cartridge ejection assemblies. Downey. Ammunition Procurement & Supply Agency, Joliet, Ill.

—Honeywell, Inc., North Hopkins, Minn. \$1,587,443. Dispensers (SUU-13/A) for the Air Force. North Hopkins. Ammunition Procurement & Supply Agency, Joliet, Ill.

—Zenith Radio Corp., Chicago. \$2,117,723. Fuze for the M72 rocket. Chicago. Ammunition Procurement & Supply Agency, Joliet, Ill.

—U.S. Rubber Co., New York City. \$9,836,-251. Explosives, and for operation and maintenance activities at the Joliet Ammunition Plant, Joliet, Ill. Ammunition Procurement & Supply Agency, Joliet, Ill.

—Clark Equipment Co., Benton Harbor, Mich. \$5,267,532. Industrial wheeled tractors. Benton Harbor. Army Mobility Equipment Center, St. Louis.

—Western Electric, New York City. \$2,052,-570. Additional research and development on the NIKE X system. Santa Monica, Calif. NIKE X Project Office, Huntsville, Ala.

—Jacks-Evans Mfg. Co., St. Louis. \$1,125,-995. Links for the 7.62mm cartridge belt. St. Louis. Frankford Arsenal, Philadelphia.

—Universal Match Corp., St. Louis. \$1,264,-025. Developments of an Army aircraft turbine engine test and run-in stand. St. Louis. Army Aviation Materiel Command, St. Louis.

—Thiokol Chemical Corp., Bristol, Pa. \$5,-078,178. Ordnance items and for operation and maintenance activities at the Longhorn Army Ammunition Plant, Marshall, Tex. Ammunition Procurement & Supply Agency, Joliet, Ill.

—General Motors, Indianapolis, Ind. \$1,-475,116. Product improvement on the T-63-A-5A engine. Indianapolis. Army Aviation Materiel Command, St. Louis.

—Vinnell Corp., Alhambra, Calif. \$13,400,-000. Construction of airfield paving and POL facilities at Kung Kuan, Taiwan. Engineer Dist., Okinawa.

—Westinghouse Electric, Pittsburgh, Pa. \$1,-900,000. Design and furnishing of reactor plant components for nuclear powered ships. Pittsburgh. Naval Ships Systems Command.

—Maxson Electronics, Old Forge, Pa. \$1,-815,446. BULLPUP guided missiles for the Air Force. Old Forge. Naval Air Systems Command.

—Todd Shipyards, Alameda, Calif. \$1,644,-365. Overhaul and repair of the attack transport USS Bayfield (APA-33). Alameda. Industrial Manager, 12th Naval Dist.

—National Co., Melrose, Mass. \$3,793,054. Radio receivers for use by the Marine Corps. Melrose. Naval Ship Systems Command.

—International Harvester Co., Solar Div., San Diego, Calif. \$2,534,229. Auxiliary power plants and related equipment for Navy helicopters. San Diego. Naval Air Systems Command.

11—Granger Assn., Palo Alto, Calif. \$2,793,-530. High-power steerable antenna systems for radio stations. Palo Alto. Navy Purchasing Office, Washington, D.C.

—Trenton Textile Engineering & Mfg. Co., Trenton, N.J. \$1,029,800. Parachutes for Mark 24 flares. Trenton. Naval Ammunition Depot, Indianapolis, Ind.

12—R. G. Webb, Inc., Riverside, Calif. \$2,268,-000. Construction of a Communication Electronics School at the Marine Corps Base, Twentynine Palms, Calif. Southwest Div., Naval Facilities Engineering Command.

13—Triple A Machine Shop, San Francisco. \$1,078,000. Repair and alteration of the store ship USS PROCYON (AF-61). Industrial Manager, 12th Naval Dist. San Francisco.

—Scripps Institution of Oceanography, La Jolla, Calif. \$1,777,025. Oceanographic research. La Jolla. Office of Naval Research.

16—Lear Siegler, Inc., Grand Rapids, Mich. \$3,794,000. Gyroscope assemblies and related equipment. Grand Rapids. Naval Air Systems Command.

17—Sun Electric Corp., Chicago. \$1,165,153. Production models of portable hydraulic test stands and related equipment for the Navy and Coast Guard. Chicago. Naval Air Systems Command.

—Boeing Co., Morton, Pa. \$25,550,000. Increased long lead time effort for UH/CH-46A helicopters. Morton. Naval Air Systems Command.

—Grumman Aircraft Engineering Corp., Bethpage, N.Y. \$1,446,000. Research and development of an integrated ECM system for EA-6B aircraft. Bethpage. Naval Air Systems Command.

18—Western Electric Co., New York City. \$1,364,079. Shipboard weapons direction equipment for TARTAR. Burlington, N.C. Naval Ordnance Systems Command.

19—North American Aviation, Anaheim, Calif. \$1,207,660. Spare parts for AN/ASD-12 bomb navigation systems for RA-5C aircraft. Anaheim. Navy Aviation Supply Office, Philadelphia.

—Metals Engineering Corp., Greeneville, Tenn. \$2,299,030. Fin assemblies for Mark 82 bombs. Greeneville. Navy Ships Parts Control Center, Mechanicsburg, Pa.

20—Jordan Co., Columbus, Ga. \$2,632,159. Construction of recruit barracks at the Naval Training Center, San Diego, Calif. Southwest Div., Naval Facilities Engineering Command.

23—Westinghouse Electric, Baltimore, Md. \$1,-040,000. Airborne sonar. Baltimore. Naval Air Systems Command.

—United Aircraft, East Hartford, Conn. \$16,219,254. T30-P-6 engines. East Hartford. Naval Air Systems Command.

—Douglas Aircraft, Long Beach, Calif. \$1,-550,000. Countermeasure sets and related equipment. Long Beach. Naval Air Systems Command.

—Sparton Corp., Jackson, Mich. \$1,338,364. Sonobuoys. Jackson. Naval Air Systems Command.

—Otis Elevator Co., Brooklyn, N.Y. \$1,250,-169. Sonobuoys. Brooklyn. Naval Air Systems Command.

—B. F. Goodrich Co., Akron, Ohio. \$1,168,-104. Tubeless tires for aircraft. Akron. Navy Aviation Supply Office, Philadelphia.

—Litton Systems, Woodland Hills, Calif. \$8,792,000. Components of the AN/ASQ-61 ballistic computer system, AN/ASN-31 inertial navigation system for A-6A aircraft, and AN/ASN-36 inertial navigation

system for E-2A aircraft. Woodland Hills. Navy Aviation Supply Office, Philadelphia.

—**General Dynamics**, San Diego, Calif. \$2,624,005. Spare parts for MK-56 mines. San Diego. Naval Ordnance Plant, Louisville, Ky.

—**Magnavox Co.**, Fort Wayne, Ind. \$2,326,550. Sonobuoys. Fort Wayne. Naval Air Systems Command.

—**Reynolds Metal Co.**, Richmond, Va. \$3,013,000. Motor tubes for 2.75" rockets. Phoenix, Ariz. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**Balaban-Gordon Co.**, New York City. \$1,698,130. Rehabilitation of various buildings at the Naval Supply Center, Bayonne, N.J. Eastern Div., Naval Facilities Engineering Command.

24—**AVCO Corp.**, Richmond, Ind. \$4,899,333. Design, development, fabrication and testing of an arming and fusing system for use in Mark 17 re-entry vehicles (Minuteman). Richmond. Naval Ordnance Laboratory, White Oak, Md.

—**John Hopkins University**, Silver Spring, Md. \$5,632,348. Research and development work for the Navy, Air Force, Advanced Research Projects Agency and NASA. Silver Spring. Naval Air Systems Command.

25—**Amron Corp.**, Waukesha, Wis. \$1,280,248. 20mm steel cartridge cases, Mark 5. Waukesha. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**Sea-Land Service, Inc.**, Elizabeth, N.J. \$12,787,200. Two year container ship service between Oakland, Calif., and Okinawa. Military Sea Transportation Service.

—**Seatrail Lines, Inc.**, Edgewater, N.J. \$10,850,000. Multi-purpose cargo system. Military Sea Transportation Service.

26—**Sangamo Electric Co.**, Springfield, Ill. \$2,835,000. Signal data recorder-reproducers for classified Navy equipment. Springfield. Naval Ship Systems Command.

—**Star Iron & Steel Co.**, Tacoma, Wash. \$1,373,100. Kingpost mounted missile and boat cranes of 47.5-ton capacity with electro-mechanical drive. Tacoma. U.S. Naval Shipyard, Charleston, S.C.

27—**TRW, Inc.**, Redondo Beach, Calif. \$12,113,000. Systems engineering and management support for Navy ASW programs. Redondo Beach. Naval Ordnance Systems Command.

—**Aircraft Armaments**, Cockeysville, Md. \$3,058,443. Design, development, fabrication and testing of a system for evaluating acoustic and torpedo countermeasures. Cockeysville. Naval Ship Systems Command.

31—**Pennsylvania State University**, University Park, Pa. \$1,075,000. Work on the MK 48 torpedo program. Naval Ordnance Systems Command.

—**Aerojet General Corp.**, Sacramento, Calif. \$1,825,200. Rocket motors with igniters for TARTER missiles. Sacramento. Naval Ordnance System Command.

—**Douglas Aircraft**, Long Beach, Calif. \$3,500,000. Long lead time effort and materials to support FY 67 procurement of A-4F aircraft. Long Beach. Naval Air Systems Command.

1—**American Electric, Inc.**, Paramount, Calif. \$2,179,757. Production of fin assemblies for bombs. Paramount. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

5—**Lockheed Aircraft**, Marietta, Ga. \$1,800,823. Spare parts for C-141 aircraft engines. Chula Vista, Calif. Warner-Robins Air Materiel Area (AFLC), Robins AFB, Ga.

—**Serv-Air, Inc.**, Enid, Okla. \$1,537,656. Services to include refueling, defueling and aircraft and vehicle maintenance in support of the pilot training program. Sheppard AFB, Tex. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

10—**General Electric**, West Lynn, Mass. \$14,565,664. Production of aircraft engines for T-38 and F-5 aircraft. West Lynn. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Electronic Specialty Co.**, Los Angeles. \$1,940,000. Production of electronic equipment for the RF-4C Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Teledyne Industries, Inc.**, Garland, Tex. \$1,795,985. Research and development of portable seismographic systems. Garland. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

11—**Douglas Aircraft**, Santa Monica, Calif. \$1,502,000. Conversion of THOR missiles to standard launch space boosters. Santa Monica. Space Systems Div. (AFSC), Los Angeles.

—**United Aircraft**, East Hartford, Conn. \$1,201,764. Production of modification kits for J-75 engines. East Hartford. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

12—**Sperry Rand Corp.**, Syosset, N.Y. \$1,000,000. Work on the avionics system for the F-111 aircraft. Syosset. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Curtiss Wright Corp.**, Wood-Ridge, N.J. \$1,298,422. Engineering services in support of Navy and Air Force R-3350, R-1820 and R-1300 reciprocating engines. Wood-Ridge. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

—**Hughes Aircraft**, Culver City, Calif. \$1,000,000. Work on the avionics system for the F-111 aircraft. Culver City. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

13—**Martin-Marietta Corp.**, Denver, Colo. \$3,115,200. Study of Manned Orbiting Laboratory compatibility requirements for the TITAN III program. Denver. Space Systems Div. (AFSC), Los Angeles.

—**Hayes International Corp.**, Birmingham, Ala. \$1,153,360. Production of adapters for cluster bombs. Birmingham. Air Proving Ground Center, Eglin AFB, Fla.

—**Sante Fe Engineers, Inc.**, Lancaster, Calif. \$2,270,000. Construction of a high thrust research facility. Edwards AFB, Calif. Air Force Flight Test Center.

—**Hazeltine Corp.**, Little Neck, N.Y. \$2,693,401. Aircraft communications equipment. Little Neck. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

16—**Indiana Construction Co.**, Mark B. Garr Co. and the Rybert and Garff Construction Co., Salt Lake City, Utah. \$2,359,000. Construction of missile training facilities at various air force bases. Corps of Engineers Ballistic Missile Construction Office, Norton AFB, Calif.

—**VARO, Inc.**, Garland, Tex. \$4,485,404. Production of ordnance ejector racks for F-4 aircraft. Mexia, Tex. Warner Robins Air Materiel Area (AFLC), Robins AFB, Ga.

—**General Electric**, Evendale, Ohio. \$1,502,000. Facilities expansion in support of the J-79 engine program. Evendale. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

18—**General Electric**, West Lynn, Mass. \$2,250,000. Component improvement program for the T-58 helicopter engine. West Lynn. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Honeywell, Inc.**, Hopkins, Minn. \$1,280,000. Production of fuses for aircraft ordnance. Hopkins. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Honeywell, Inc.**, Hopkins, Minn. \$5,238,520. Production of fuses and related items for aircraft ordnance. Hopkins. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Martin Marietta**, Middle River, Md. \$2,388,614. F-106 aircraft. Middle River. San Antonio Air Material Area (AFLC), Kelly AFB, Tex.

—**Systems Development Corp.**, Santa Monica, Calif. \$1,373,767. Design and development of electronic information and communications equipment for air defense systems. Santa Monica. Electronic Systems Div. (AFSC), L.G. Hanscom Field, Mass.

—**Collins Radio Co.**, Richardson, Tex. \$1,040,000. Engineering, production and installation of a ground communication system for Eglin AFB, Fla. Richardson. Oklahoma City Air Materiel Area (AFLC), Tinker AFB, Okla.

—**Magnavox Co.**, Fort Wayne, Ind. \$1,123,322. Production of airborne communications equipment. Fort Wayne. Warner Robins Air Materiel Area (AFLC), Robins AFB, Ga.

—**Lear Siegler, Inc.**, Grand Rapids, Mich. \$1,191,000. Aircraft gyroscopes and spare parts. Grand Rapids. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

19—**Superior Air Products Co.**, Newark, N.J. \$2,207,356. Production of liquid oxygen/nitrogen generating plants and related equipment. Newark. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

20—**Emerson Electric Co.**, St. Louis. \$4,565,450. Automatic test equipment for F-111 aircraft. St. Louis. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

23—**M.I.T.**, Cambridge, Mass. \$4,090,000. Research and development of advanced electronic programs including space communications. Lexington, Mass. Electronic Systems Div. (AFSC), L.G. Hanscom Field, Mass.

—**American Electric, Inc.**, Paramount, Calif. \$7,801,196 and \$7,454,875. Production of 500- and 750-pound bombs. Mirada, El Cajon and Long Beach, Calif. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

24—**Olin Mathieson Chemical Corp.**, East Alton, Ill. \$1,694,400. Cartridge type engine starters for B-52, KC-135 and F-4 aircraft. East Alton. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

25—**Goodyear Aerospace Corp.**, Akron, Ohio. \$1,087,790. Production of air cargo handling pallets. Akron. Warner-Robins Air Materiel Area (AFLC), Robins AFB, Ga.

—**Federal Electric Corp.**, Paramus, N.J. \$1,012,554. Work on space communications at Vandenberg AFB, Calif. Air Force Satellite Control Facility, Los Angeles.

26—**General Dynamics**, Forth Worth, Tex. \$1,600,000. Design studies of airborne fire control radar. Fort Worth. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Lockheed Missiles & Space Co.**, Sunnyvale, Calif. \$12,916,000. Launch services for the AGENA rocket from April 1965 to Sept. 1967. Vandenberg AFB, Calif. Space Systems Div. (AFSC), Los Angeles.

—**Hughes Aircraft**, Culver City, Calif. \$2,309,373. Production of components for the F-106 fire control system. Los Angeles. Warner-Robins Air Materiel Area (AFLC), Robins AFB, Ga.

27—**Boeing Co.**, Seattle Wash. \$2,250,000. T-50 engines for drone helicopters. Seattle. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**North American Aviation**, Anaheim, Calif. \$1,000,000. Work on the avionics system of the F-111. Anaheim. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Sperry-Rand**, Phoenix, Ariz. \$1,277,329. Production of calibration instruments for aircraft compasses. Salt Lake City, Utah. Oklahoma City Air Material Area (AFLC), Tinker AFB, Okla.

—**Pittsburgh-Des Moines Steel Co.**, Pittsburgh, Pa. \$1,355,700. Production of ducting systems for Air Force wind tunnels. Pittsburgh. Arnold Engineering Development Center (AFSC), Tenn.

31—**General Dynamics**, San Diego, Calif. \$1,134,231. Production of spare parts for the ATLAS/AGENA space booster. San Diego. Space Systems Div. (AFSC), Los Angeles.

—**Honeywell, Inc.**, Hopkins, Minn. \$5,238,520. Production of fuses and related items for aircraft ordnance. Hopkins. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Martin Marietta**, Middle River, Md. \$2,388,614. F-106 aircraft. Middle River. San Antonio Air Material Area (AFLC), Kelly AFB, Tex.

—**Systems Development Corp.**, Santa Monica, Calif. \$1,373,767. Design and development of electronic information and communications equipment for air defense systems. Santa Monica. Electronic Systems Div. (AFSC), L.G. Hanscom Field, Mass.

AIR FORCE

2—**Gas Equipment Engineering Corp.**, Milford, Conn. \$2,202,050. Production of liquid oxygen/nitrogen generating plants. Milford. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

—**North American Aviation**, Los Angeles, \$1,700,000. Work in support of Air Force and National Aeronautics and Space Administration flight test programs. Los Angeles. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

3—**Aerojet General Corp.**, Downey, Calif. \$1,542,846. Production of bombs. Downey. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Monarch Machine Tool Co.**, Sidney, Ohio. \$1,441,887. Production of machine tools. Sidney. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Armco Steel Corp.**, Columbus, Ohio. \$2,172,960. Production of components for metal revetments. Middletown, Ohio. Wright-Patterson AFB, Ohio.

4—**Lear Siegler, Inc.**, Grand Rapids, Mich. \$1,017,634. Production of components for C-141 aircraft instruments. Grand Rapids. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.



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OFFICIAL BUSINESS

FLARE

DSA Advanced Procurement Planning List Program Established

A new logistics tool, called Advance Procurement Planning Lists (APPL), is now being used by the Defense Supply Agency (DSA) to inform industry about future buying plans. DSA is responsible for purchasing common items for the Military Services.

The primary purpose of the APPL is to furnish advance information to industry with the expectation that individual firms, assisted by this information, can and will systematically schedule DSA requirements along with their normal commercial production, thereby reducing the impact of procurement relative to production capacity and price.

Advance Procurement Planning Lists are also furnished to specific Military Service activities which are responsible for providing procurement technical data. These activities use the lists in validating upcoming procurements prior to solicitation by the DSA supply centers concerned, thus reducing procurement lead time.

Another important use of the APPL is in connection with sole source breakout studies. Very important program (VIP) items and high value items on the APPL are identified and given first review precedence by the individual Center Sole Source Review Panel concerned.

The format for the APPL requires that the list be phased by quarters and include, as a minimum, such specifics as Federal stock number, item name, applicable specification or other technical data, quantity of items and the scheduled period of procurement for each.

All DSA supply centers issue these advance forecasts to industry, usually covering a future period of from six months to one year. The DSA supply centers are as follows:

Defense Personnel Support Center
2800 South 20th St., Philadelphia, Pa. 19101
Defense Construction Supply Center
3990 E. Broad St., Columbus, Ohio 43215
Defense Electronics Supply Center
1507 Wilmington Pike, Dayton, Ohio 45401
Defense General Supply Center
Richmond, Va. 23219
Defense Industrial Supply Center
700 Robbins Ave., Philadelphia, Pa. 19111
Defense Fuel Supply Center
Cameron Station, Alexandria, Va. 22314

CIR Reports Approved

The Defense Department has received Bureau of the Budget approval for the collection of Cost Information Reports (CIR) through DD Forms 1558 through 1558-4.

CIR is designed to collect cost and related data on aircraft, missile and space systems and their components to provide a bank of historical data for use by DOD in estimating and analyzing the costs of weapon system development and production.

Initially, data will be collected on approximately 25 weapon/support systems which are now being selected. Cost Data Plans are now being processed by the OSD Cost Data Plan Review Board composed of representatives from the Offices of Assistant Secretary of Defense (Comptroller), Assistant Secretary of Defense (Systems Analysis) and Assistant Secretary of Defense (Installations and Logistics).

The operation of this subsystem of the Resource Management System will be monitored by the Directorate of Assets Management Systems in the Office of the Assistant Secretary of Defense (Comptroller). The directorate is headed by Colonel Herbert Waldman, USAF, who reports to the Deputy Assistant Secretary of Defense for Management Systems Development.